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GAS JOURNAL

LIGHT ✦ HEAT ✦ POWER ✦ BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

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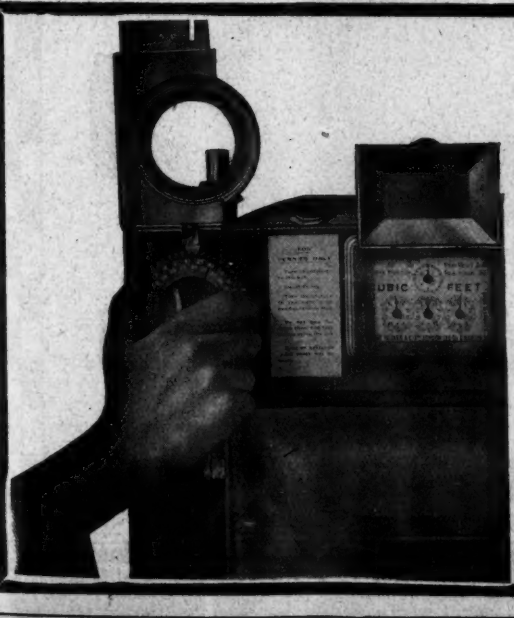

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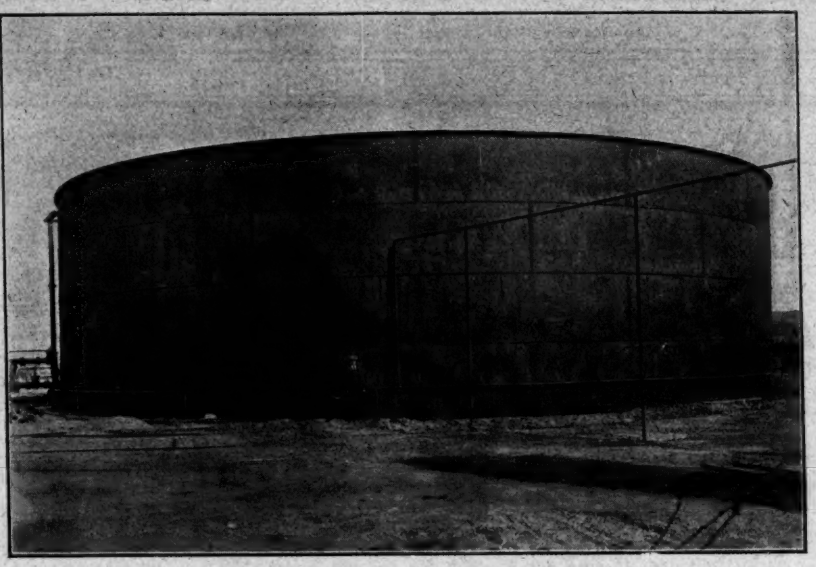

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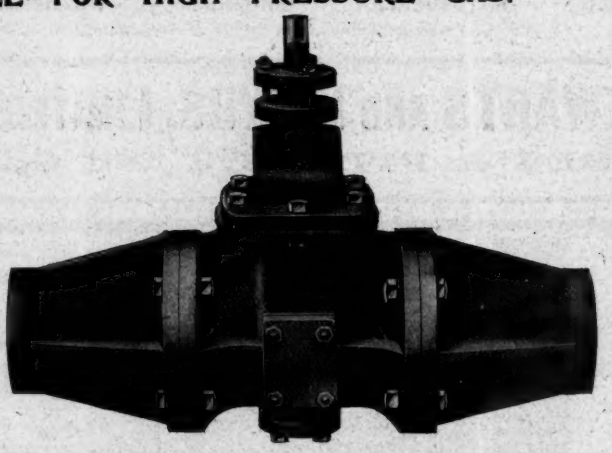

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GAS JOURNAL

LIGHT HEAT POWER BYE-PRODUCTS

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VOL. CLVII., No. 3067.] WEDNESDAY, FEBRUARY 22, 1922. [74TH YEAR.

EDITORIAL NOTES.

Carbon Monoxide from Various Points of View.

AMONG the several interesting topics with which he dealt at the meeting of the proprietors of the South Suburban Gas Company, the Chairman (Mr. Charles Hunt) referred to the question of carbon monoxide. He showed conclusively that there was no ground for any restriction of the percentage of that constituent in gas, and that the economic aspects of water-gas manufacture must not be overlooked in the public interests. Some people write and talk as though the men of the gas industry are not only callous, but inordinately so, over this question. They are not. But what they fairly ask for are the data, if obtainable, that show the need for the restriction of carbon monoxide in gas? So far nothing has been advanced of a definite or satisfying nature in support of limitation; only slipshod *ipse dixit* of a few persons, supported by "The Times," the writings in which show that editorial knowledge on the subject is of quite atomic character. Every time our contemporary puts its pen to paper on this question, the hand is seen of the amateur in regard to it. But more as to this presently. As Mr. Hunt says, there is no proof of the need for restriction—particularly when considered in relation to other risks that are daily being run in connection with other public services, and which risks materialize much more frequently than in the case of gas supply.

Prof. H. E. Armstrong was at the meeting of the South Suburban Gas Company, and, as is his wont, he spoke. If he would refrain from taking the part of an itinerant advertiser of low-temperature carbonization—so wasting the time of other men at gas companies' meetings by his advocacy, and by insinuating that men who have spent a lifetime in the study of the requirements of the industry and of its customers do not know their business so well as he himself does—his remarks would at any rate be condensed, and might become more valuable, and time would be saved. He has spoken at several meetings on this matter of low-temperature carbonization; and we think it may be safely said that the proprietors do not want to hear him again. Low-temperature carbonization is not a matter for the consideration of which they are called together. They can well leave it as a question for discussion and determination by their directors in consultation with their technical officials. What Prof. Armstrong said on the subject at the meeting was described by one proprietor as "nonsense;" but however much the description was justified in respect of low-temperature carbonization, it must be admitted that he spoke quite well on the question of carbon monoxide. He made several points in referring to it. But we only desire to refer to two of them. One is that everybody is now smelling gas everywhere, or is fancying he can. We had not noticed this, nor were we aware of it from other quarters of information. If it be true, then it can only be one of the results of newspaper publicity, and the attempts made to raise alarm, to which publicity and to which attempts we have not the slightest doubt some of the recent suicides by gas are due. We are inclined to think that Prof. Armstrong is of the same opinion. Another point. He declares that Prof. Bone used carbon monoxide really as a bit of bye-play, in order to drive home the case for gas of higher calorific power. We have no positive information whether or not Prof. Bone has admitted Prof. Armstrong into his confidence in this matter. But knowing Prof. Bone, we may say flatly that we do not believe Prof. Armstrong is correct in his assertion. The former is not in the habit of having recourse to such trickery as to attack openly one thing in order to attain an obscured objective. However mistaken we may think Prof. Bone is in his attitude upon this carbon monoxide question, we know full well that had his objective been a higher concentration of calorific power per cubic foot, he would have said so, and would not have adopted carbon monoxide simply as a ruse. He urged carbon monoxide restriction; and that, despite Prof. Armstrong's declaration, is what he meant. Why that attitude, Prof. Bone has not yet explained, nor justified by statistics as to purely accidental deaths. He knows quite well the weak sides of his case; those are the sides he leaves without notice, or at most with only the thin support of incidental reference.

Then (as previously indicated) "The Times" has in an editorial article again returned to the subject; and once more demonstrates that it is wallowing in ignorance over the matter, and is simply taking its cue from Prof. Bone and Dr. Haldane, without paying any heed to experience and records which tell that the fears of one or two men are not translated into anything material, more especially when judged in relation to other risks to which human life is daily exposed. We do not blame the would-be restrictionists for not treating of these matters. They would spoil their case. But though not blaming them, we are quite at liberty to think what we like on the interesting subject of sportsmanlike tactics. "The Times" does not take into account that the toxic influences of carbon monoxide can be, and are daily, in hundreds of thousands of homes brought under perfect subjection by the means of use and human care, which are better and more effective than restriction, seeing that all town gas contains a percentage of carbon monoxide. It refers to the new Order made under the Gas Regulation Act, which provides that where carbon monoxide is a constituent of gas, the supply shall possess the pungent odour of coal gas. Inasmuch as in this country there is no water gas supplied that is not mixed with a larger proportion of coal gas and so has a pungent odour, there is conclusive evidence here that there are few deaths traceable to gas—"few" in relation to population—that are not either deliberate acts or the result of gross negligence.

The knowledge of "The Times" on the subject is further evidenced by its comparison of water gas with carbon monoxide. Apparently it has the idea that the terms are simply interchangeable. It refers to the supply by some undertakings of one-third water gas and two-thirds coal gas, and says this proportion is nearly three times what was considered safe by (the late) Sir William Ramsay and Dr. Haldane. It is nothing of the kind. The 33 p.ct. is water gas. The 12 p.ct. advocated by them nearly a quarter of a century ago (before practical experience had taught us so much as to the groundlessness of fears) was carbon monoxide. With 33 p.ct. of carburetted water gas, the mixture may contain some 14 or 15 p.ct. of carbon monoxide, and that is not "three times" the 12 p.ct. advocated by the two scientists nearly 24 years ago. Now Dr. Haldane and Prof. Bone urge a limit of 20 p.ct.; while most other sensible people say there is no evidence to justify limitation even to that amount. Prof. Bone had better give a little closer attention to the instruction of "The Times" on this question. It is a pity for it to make itself foolish through ignorance. It also seems to think that Dr. Carpenter was treating the matter in light vein when, at the meeting of the South Metropolitan Gas Company, he spoke of the distribution of carbon monoxide in the streets from the exhaust-pipes of motor vehicles, and of tobacco smoke containing a percentage of the same toxic. And it seemed to think that the Governor of the Gas Light and Coke Company (Mr. D. Milne Watson), at the meeting of the proprietors, "abounded

"in the same sense." Never were those two responsible men of the gas industry more serious. However, "The "Times" does not appear quite so sure of its position. The tone of its last article is not of exactly the same dogmatic order as the former ones. It winds it up by saying that it was doubtless good to reassure the shareholders; but it would be better to reassure the public by holding another inquiry. So far as we can see, the public do not appear to have been aroused to any fervent interest in the matter. When "The Times" shows somewhat more elementary knowledge on the subject, and can advance data proving an increase in gas-produced fatalities per million of the population, or an increase in relation to the augmentation of the numbers of consumers or of the consumption of gas—say, in the past twenty years—then the gas industry will not be able to maintain the plea that there is nothing further to investigate.

The Therm and Selling Gas and Gas Appliances.

THE therm has a value in the selling of gas and gas appliances. There were some men, and prominent ones too, who at one time thought there was not a shred of advantage in it for that purpose, but that it was nothing more than a device that would be confusing to the consumers. We have always held to the contrary. Good support for this belief is found in the paper that Mr. S. T. S. Musgrove, of Sheffield, read before the Yorkshire Junior Gas Association last Saturday; and after nearly seventeen months' experience of the system of charging and business-getting on the therm basis, the South Metropolitan Company (as was seen last week) have nothing but praise for it. Mr. Musgrove presents the position as he sees it; and his view is that for business-getting purposes there is considerable benefit in being able to quote consumptions and efficiencies on a definite instead of an indefinite basis such as cubic feet. And under the Gas Regulation Act, there is also the higher minimum gas pressure which is another benefit to the salesman as well as to the consumer of therms. The therm, however, is Mr. Musgrove's subject. The greatest advantage of all is that the therm supplies a definite basis for quoting actual consumptions for a given amount of work, or for producing maximum efficiency, with any appliance. This is a benefit not only to the gas suppliers, but to the manufacturers of gas appliances, and particularly to the consumers who use them. To tell a consumer that the consumption of a burner or any other appliance is a certain number of cubic feet for a given performance is to tell him something that can only obtain under certain definite conditions, particularly in regard to the calorific value of the gas. With variations in this, the consumption in cubic feet will, of course, alter. In a district where a 425 B.Th.U. gas is supplied, the consumption in cubic feet will be more than in a district where the gas is of 500 or 525 B.Th.U. per cubic foot. This is elementary; but it is this elementary fact that is overlooked even in certain areas where the therm system of charging has been introduced. Quotations as to consumptions should now be in parts of a therm, or in B.Th.U.

While on this point, we should like to make an appeal to our manufacturers of gas-using appliances. It is time they began to alter their catalogues; seeing that a large part of the gas supply of the country is now sold on the therm basis, and probably during this year all statutory gas undertakings will be brought into line in this respect. In their catalogues, we see that consumptions are still quoted in cubic feet. Cubic feet of what—400, 450, 500, or 550 B.Th.U. gas? The manufacturers will have to come into line, and say how many B.Th.U., or what fraction of a therm, is the consumption for a certain efficiency, or for giving a maximum result. The manufacturers must not continue to live in the past, while the gas-supply industry is working on a new basis brought into being by legislative enactment. As Mr. Musgrove points out in his paper, a therm with 500 B.Th.U. gas requires 200 c.ft., with 450 gas 222 c.ft., with 425 gas 235 c.ft. Quotations of performance on the cubic feet basis are therefore in these times wrong for general application; and they have become more so with the widely varying declared values adopted by gas undertakings under the fresh liberty with which Parliament has endowed them—that of making gas of the calorific power per cubic foot that best complies with the economic conditions.

In selling gas and gas appliances, Mr. Musgrove urges that the consumers should be by every means instructed as to the facts. This is highly important. It was thought that there would be difficulty in this regard; but the difficulties that were the products of men's imaginations are being dissipated by practical experience. Of course, there are initial difficulties in cultivating understanding of the new conditions. But gas consumers are not all unintelligent; and appreciation will spread and deepen by the natural means of dissemination, which will be quickened by the special efforts of the gas suppliers. Where must the education of the consumer start? The answer is, with the gas suppliers' own sales and distribution staffs. Mr. Musgrove lays great emphasis, and rightly so, upon this. He would have every man from inspector to fitter who comes into touch with the consumers thoroughly educated in the therm system, so that he can talk reasonably and rationally in terms of the therm. All these men are representatives of the gas suppliers. They will all be asked questions; and they must all be in a position to give reliable answers. It is no good educating them superficially. They must be thoroughly grounded in the therm, and to ensure this they should be put through their paces thermally over a period by one of their superior officers. Now, too, that carbon monoxide has lately become a matter of public attention, the men who move among the consumers should be instructed concerning it. It is no use leaving things to take care of themselves. And it is bad policy to let the consumers see that ignorance prevails among the men employed by the gas suppliers. They must all be qualified gas missionaries, and popular educators. Mr. Musgrove instances as one question that may be asked of men who come into contact with the consumers, Why has the change been made from cubic feet to the therm? He says that one answer that will satisfy is that "the method "of charging has been changed in order to bring it into line "with the method of use." That is quite true; but will it satisfy? A better answer perhaps would be that the basis of charge has been changed, because the cubic foot took no account of quality; that the heating value of the gas is of primary importance; and therefore on thermal value the charge is now based by Parliamentary enactment—so much per therm no matter how many cubic feet are required for the supply of 100,000 B.Th.U. To assist the outdoor staff in these therm matters, as well as upon the carbon monoxide question, we have devoted some space in this month's "Gas Salesman" supplement, which is published with this issue of the "JOURNAL."

Another important matter on which the whole of the men who came into contact with the consumers should be well informed is as to the rigorous testing to which the gas is submitted under the therm system—testing enforced by the Gas Regulation Act, and the details of which are prescribed by independent and impartial Gas Referees. No loopholes are left for the escape of the gas suppliers from fulfilling their obligations to the public; and the former are not by any means sorry to have the proof of fulfilment of their obligations taken off their shoulders, and placed upon those of independent and competent men. There can be no dispute now. If the official report of a gas examiner gives a certificate of compliance with the declared calorific value, then "all's well." And a further point to impress upon the consumers is that, in order to ensure compliance, the gas suppliers have to provide a B.Th.U. margin of safety over and above the declared value; and from that the consumers benefit without extra charge. Thus the public are fully protected.

The paper by Mr. Musgrove deals with several other matters. The one we have been discussing is of main importance. He also calls attention to the diverse categories into which gas use is divided—in the domestic area, lighting, cooking, heating, water heating, and he might have added gas coppers, irons, and various other appliances; and in the industrial field, lighting, furnace and other heating, and power. When this diversity of use is considered, when economy, efficiency, and satisfaction so much depend upon recommendation, it shows how important it is that only fully qualified men should be engaged as gas salesmen—and "fully qualified" means technical as well as commercial competence. There are many obsolete things in methods and organization of which some sales departments should be relieved, just as there are obsolete appliances of which consumers in their own interests should be advised to rid themselves. Encouraging points, too, are made from the experiences at Sheffield as to the use of gas industrially for heating and power; and there is strong advocacy of maintenance. This is all worth reading. There is stimulation in it. The paper from beginning to end will serve a good purpose.

An Analysis—What is the Explanation of the Reduced Tar Yield?

TO-DAY we publish the interesting and valuable analysis which Mr. F. J. Bradfield, the Secretary of the Commercial Gas Company, annually makes of the London Gas Companies' accounts. The therm system has produced changes in the tables on this occasion; and it will bring about greater changes in succeeding years. It will be observed that the first page of tabular matter shows the working results and the revenue costs per 1000 c.ft.; and the second sheet, the results and costs per therm. Some of the items are repeated so as to make each sheet complete. It should perhaps be explained that the price per therm is not necessarily the equivalent price to that shown per 1000 c.ft., but represents the actual price charged during the year—in the earlier months at per 1000 c.ft., and subsequently at per therm. In view of the therm calculations, the usual comparison with the previous year is not made. Presumably another year Mr. Bradfield will drop the cubic feet comparison, and compare the two years in therms only.

Perhaps the most interesting item in the analysis is the therm production per ton of coal carbonized. It is notable how fairly closely the Companies run in this respect; the outstanding one being the South Metropolitan Gas Company with 69·91 therms. But this is on the declared value; so that, if the actual value were taken, the Company would be showing over 70 therms per ton, with straight coal-gas making, and a declared value of 550 B.Th.U. Assuming that the actual value throughout the year was in the neighbourhood of the official tests for last quarter (554·6 B.Th.U.), the make per ton would be actually 70·49 therms. Of course, speaking of the figures generally, the average of the past year cannot be taken as any real gauge of normal working, owing to the coal strike and the large amount of inferior foreign coal that militated against good results, and so helped to depress the average. Considering this, it may be anticipated that the coming year will see an improvement in this respect.

The figures in the present analysis as to tar produced per ton of coal arrest attention. They are low. When we look back only as far as 1917, the higher figures then suggest that present-day carbonization and coal quality must have something to do with the decreasing yield of tar per ton of coal. It is interesting to place the figures in comparison:

	1917. Gallons.	1921. Gallons.
Gas Light	9·59	8·94
South Metropolitan	9·47	9·13
Commercial	10·51	9·31
Brentford	12·14	10·72
South Suburban	—	8·89
Wandsworth	9·17	8·57
Tottenham	10·14	9·42

The figures do not include water-gas tar. The reduction' it will be seen, is general; and it would be very interesting to have an explanation as to the cause or causes of this.

The comparison of the cubic feet costs with the costs per therm will, we think, astonish some gas administrators. One has only to look at the total expenditure costs (less residuals) of each Company to realize how misleading are the costs based on quantity. The fall in the amount realized for the secondary products as compared with 1920 is mainly the reason for the increased costs into the holder. The relative figures are as follows:

Cost into Holder per 1000 *C.Ft.*

	1920. Pence.	1921. Pence.
Gas Light	30·64	39·49
South Metropolitan	30·06	34·72
Commercial	32·62	38·65
Brentford	44·40	46·14
South Suburban	38·84	43·02
Wandsworth	36·83	43·82
Tottenham	42·23	45·78

Among other points it is noticed that Mr. Bradfield credits the South Metropolitan Company with having secured an increase in consumption last year of 0·54 p.ct. on the cubic feet basis; all the other Companies showing decreases. In the Directors' report of the South Metropolitan Company, reference is made to a decrease of 1·8 p.ct. in the gas sales. This is probably on the therm basis at the declared value. It will also be observed that all the Companies show a deficit in the balance of profit as compared with the authorized dividend and interest, except Brentford and Tottenham—the balances in these two instances being 0·16d. and 0·06d. per therm respectively. However, costs—for both labour and materials—are falling; and in spite of lower prices for secondary products and a reduced output of gas, responsible gas officials are looking forward with every confidence to the trading of this year being successful.

Industry and Taxation.

EVERY industry in the country badly wants for its quicker restoration and the promotion of greater flexibility and mobility a re-creation of financial, economic, and political confidence, together with the reduction of Government expenditure to the lowest possible level, and a lightening of the burden of taxation. The Government have had the Geddes reports on the subject of the cutting-down of expenditure for which Parliament is responsible. What beneficial effect they will have cannot be said at the present time. The Chancellor of the Exchequer (Sir Robert Horne) has received a deputation from the Federation of British Industries, who warned him of the gravity of the industrial and commercial position, and of what will happen if there is not prompt alleviation of taxation. In similar manner, other prominent financial and industrial leaders have been speaking lately. Heavy taxation impedes development, and in some industries it is actually causing a shrinkage of business capacity. This means a limitation and even a reduction of the scope of taxation. Better would it be for the country that there should be a lightening of the burdens, and that the taxable area should be increased by industrial and trading development. This seems to be the sane way of meeting the present chaotic and debilitating situation. The President of the Federation of British Industries (Col. O. C. Armstrong), who headed the deputation to the Chancellor, urged the Government to reduce the income-tax by 2s. in the pound, and to abolish the Corporation Tax. As to the former (though Sir Robert Horne declined to have his statement published), it is understood that the Government are keenly anxious to make a reduction; but there is unofficial suggestion that it cannot be more than 1s. in the pound. We shall all be glad of some concession; but, if possible, preferably the 2s. At the same time, it must be admitted that a 33 p.ct. reduction is a big inaugural slice; and so expectations must not be pitched too high. As to the abolition of the Corporation Tax, nothing definite is said as to any possible intentions of the Government. The period during which public utility concerns were exempt from it is passing on; and emphatic protests against its application to such concerns have been made, at the annual meetings of the proprietors, by the Governor of the Gas Light and Coke Company (Mr. D. Milne Watson) and the President of the South Metropolitan Gas Company (Dr. Charles Carpenter). Another point made by the deputation to the Chancellor was that proportionate adjustments should be made in the super-tax paid by private firms. It was also urged that the Government should consider the advisability of permitting posterity to bear its share of the nation's indebtedness. It is predicted that, if industry is called upon to bear this accumulation of burdens for another year, there is grave danger of a crisis of the first magnitude. There must be relief. Taxation is absorbing the liquid assets required for other purposes; and through this, combined with falling prices and the general uncertainty, people are not placing orders and spending capital freely, and many cannot do the one or the other. All movements are limited and confined. In the gas industry, we are looking forward with good spirit; but if the shackles of industry generally were loosened, the hopeful views of the gas industry would grow still larger.

Institution Annual Meeting.

Members of the Institution of Gas Engineers will make a note in their diaries of the dates fixed by the Council for the annual meeting—June 20 to 22—when Mr. Thomas Hardie, M.Inst.C.E., Chief Engineer of the Gas Light and Coke Company, will be in the Presidential Chair. The members of the Société Technique de l'Industrie du Gaz will be received on June 22; and the following day the members of the Institution and their French guests will visit the Beckton works of the Gas Light and Coke Company. We were all sorry last year that the coal strike intervened, and upset the plans that had been made for the

visit of our French colleagues; but the delay will not have caused in any degree a lessening of the warmth with which they would have been received by their British professional friends. On the contrary, every year the bonds of our friendship grow stronger; and the greeting will be of the very best.

Accounts under the Regulation Act.

For the time being, gas undertakings coming under the powers of the Gas Regulation Act will continue the present form of accounts and the requirements in regard thereto. The form that future accounts shall take is being considered by the Board of Trade; but in view of the fact that the Board have promised to consider carefully any suggestions put forward, the National Gas Council have appointed a small Committee to consider the form the future accounts might take. The first part of this statement, however, does not mean that the present accounts are not in any way to recognize the therm. In the case of undertakings now working under an Order issued in accordance with section 1 of the Act, references as to price of gas in the present accounts should be at per therm; and the statement as to gas made, sold, &c., should also be shown in therms, and if thought desirable cubic feet as well. On Feb. 8 we referred in the first editorial article to the modes of presentment in the cases of the Gas Light and Coke Company and the South Metropolitan Gas Company.

"The Gas Salesman."

With this issue No. 2 of "The Gas Salesman" supplement is published. Gas undertakings that have not sent in permanent orders for extra copies for distribution among their sales staff should do so without delay, as the margin of copies beyond those on order will be limited.

Board of Trade Returns.

The Board of Trade returns relating to statutory gas undertakings have become such an institution that it is hoped they will not be discontinued. There is some talk of this. Economy is in the air, and expenditure is being cut down. Discontinuation of publication is proposed by the Treasury. These, however, are the only official returns the gas industry possesses; and the statutorily controlled part of the industry does not consider itself by any means unimportant. The Central Executive Board of the National Gas Council have decided to impress upon the Board of Trade the vital necessity of continuing the publication of the returns. The whole gas industry will be prepared to support the Council in their action.

Sulphate of Ammonia Shipments.

The quantity of sulphate of ammonia shipped last month exhibited a fall, compared with the same month of 1921. The quantity was 16,854 tons, as against 20,216 tons. The values, according to the Board of Trade returns, were respectively £266,380 and £629,419—a vast difference.

Gas Coal and Coke Exports.

The extent to which gas coal shipments are ascending is shown by the figures in the Board of Trade returns for January. The total quantity of coal exported was 4,020,935 tons, compared with 1,700,106 tons in January, 1921, and 3,358,572 tons in January, 1920. Of the first-named quantity, 501,723 tons were gas coal, which figure compares with 210,235 tons in January, 1921, and 262,183 tons in January, 1920. The gas coke exported last month was 67,709 tons (valued at £103,778); in January, 1921, 31,619 tons (valued at £135,504); and in January, 1920, 80,353 tons (valued at £351,579).

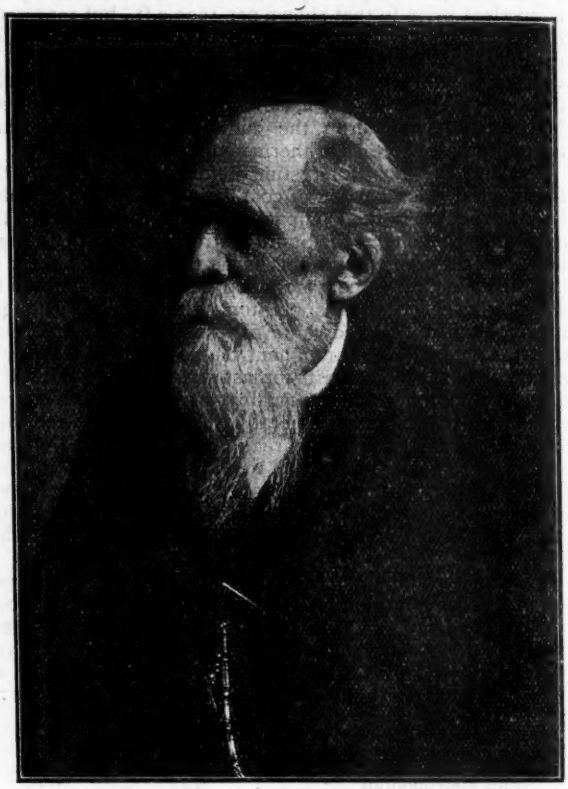
Gas Coal Position.

In the North several contracts for gas coal for use abroad are being entered into, but not for immediate delivery. The collieries are practically sufficiently committed until the end of March; so that most contracts for abroad are being made for delivery after that month. In view of this condition of things, prices for export are very firm. There is also more evidence of inquiry on a contract basis for home gas-works—particularly for the best grades of gas coal and nuts. In Yorkshire, the demand has tailed-off somewhat; but this can be only temporary.

OBITUARY.

WILLIAM COWAN.

We regret to learn that Mr. William Cowan, of Edinburgh, died at his Bournemouth residence on the 18th inst., in his 90th year. He was well-known to a former generation of gas engineers, having been the senior partner of Messrs. W. & B. Cowan, Gas-Meter Manufacturers, and subsequently Chairman of the Directors of Messrs. Parkinson and W. & B. Cowan, Ltd., until, owing to advancing years, he resigned that position in favour of his only son Sir Henry Cowan, M.P. Born in Glasgow in 1833, Mr. Cowan in time succeeded to the business of his father, which was established at Glasgow in 1825, and at Edinburgh in 1847, since when it has extended to various parts of the British Empire.



The Late Mr. William Cowan.

Our correspondent, who has known Mr. Cowan for nearly fifty years, speaks of him as a true gentleman of the old school, whose kindly disposition and high honour and integrity were much appreciated by all with whom he came in contact. He was an enthusiastic Scotsman, engaged in good works; and his inventive faculties, which were of a high order, were devoted to the improvement of gas apparatus generally.

The funeral takes place to-day (Wednesday), at 3.50 p.m., at Alrewas Church, near Lichfield.

JOHN BALLANTYNE.

The death occurred with distressing suddenness, last Sunday week, of Mr. John Ballantyne, Gas Engineer and Manager to the Hamilton Corporation, who, while sitting at home talking to his wife, collapsed, and expired within a short time. He had been ill recently, but had recovered sufficiently to attend to his duties up to the previous day.

A native of Orkney, Mr. Ballantyne had a life-long association with gas-works. He received his early technical training at Greenock, and in 1888 went from there to Rothesay, where he had charge of the gas undertaking. This concern flourished greatly under the management of Mr. Ballantyne. In October, 1900, he was appointed Manager of the Hamilton Corporation Gas-Works in succession to Mr. W. Ewing, who had been appointed Manager at Greenock. When Mr. Ballantyne was selected for the Hamilton post, the view was expressed that he would prove an able and worthy successor to Mr. Ewing; and this forecast was amply fulfilled, the Hamilton Gas-Works under his care having made very great progress. So much has this been the case, that they have come now to be looked upon as the most valuable of the burgh's properties. In addition, the works have been kept in the forefront in regard to technical equipment; and some time ago a Woodall-Duckham installation of vertical retorts was put down, to cope with the increased demands which were being made.

Outside his particular sphere, Mr. Ballantyne was widely known for his interest in scientific subjects, and was a recognized authority on botany and entomology, on which he lectured with

much success. Much sympathy will be felt with his widow and grown-up family. In the Town Council, tribute was paid to his judgment, fidelity, and technical skill; and it was declared that he commanded the respect of all classes of the community with whom he came in contact. It was resolved that the Council record their sincere sense of their loss through Mr. Ballantyne's death, and an appreciation of the very faithful services he had rendered.

The death has occurred at Derby, following an operation, of Mr. ROBERT HALL, a Matlock manufacturer. Deceased, who was 78 years of age, was the Secretary and a Director of the Matlock and District Gas Company.

PERSONAL.

Mr. JOHN PHILLIP LAWSON, Assistant Engineer and Manager of the Walton-on-Thames Gas Company, has been appointed Manager of the Whitchurch (Salop) Gas Company, to succeed Mr. J. F. Tyndall. There were 97 applicants for the position. Besides a useful training and career at Cheltenham, Haywards Heath, Winchester, and Walton-on-Thames, Mr. Lawson served during the war, first as a private, and subsequently was granted a Commission. He was promoted to Captain, and was awarded the M.C. for services in the field.

Among the Associate members elected at a recent meeting of the Institution of Civil Engineers, was Mr. GORDON HELPS, B.Sc. (Leeds), of Messrs. Humphreys and Glasgow, Ltd.

Mr. JAMES H. BOOTH, Works Manager in the Gas Department of the Oswaldtwistle Urban District Council, has been appointed Engineer and Manager of the Poulton-le-Fylde Gas-Works. There were 74 candidates for the post.

ELECTRICITY SUPPLY MEMORANDA.

THE electrical press blows hot and cold over the position of domestic development of the uses of electricity. We have noted this before. Writers are sanguine and optimistic in the forepart of what they have to say on the subject, and then invariably end on the dejecting note of high cost. In the Commercial Development Section of the "Electrical Times" we read that, so far as the programme for development is concerned, the new year has opened well; and the prospects are good for an abundant harvest. Then high places on the technical side of the industry are showing an intensified interest in the commercial side. This is regarded as a hopeful sign, because they are men of influence. Then another "hopeful sign" is that the Hammersmith Borough Council Electricity Committee are spending £500 in laying mains and wiring houses (in a street to be selected) for educational purposes, and are holding an exhibition later on. Certain electricity undertakings have held exhibitions during January, and others are doing the same. Apparently, after long years of lethargy, contractors are beginning to realize how vast is the field open to them; and they are being helped by the manufacturers, who seem lately to have wakened to the fact that showrooms of their own would be helpful. The view is that no better opportunity than the present has occurred for pushing home the advantages of electricity. One reason is that gas consumers have received their Christmas accounts with charges at per therm instead of at 1000 c.ft. If the accounts had been for electricity of sufficient amount to do an equal amount of work, many householders would have almost lost their mental balance. After struggling with these accounts, it seems that they have turned to the newspapers and read of the dangers of carbon monoxide. That is childish, seeing that the gas-output curve has had a smart ascent these last few weeks. But the carbon monoxide stunt is one of the things upon which the electricity supply industry hopes to build-up domestic electrification for purposes other than lighting. The writer thinks that once a house is wired, the canvasser has nothing to fear from gas. The electrical canvasser knows how much value he can place upon those words. However, we always, as intimated in the beginning of this note, come to the truth sooner or later. The writer says: "The initial cost of wiring a house for electricity is a difficulty which it would be idle to ignore; and this is a matter which will have to be tackled on businesslike lines in the future." And it is not only the cost of wiring that worries householders. In addition, there is the expense of apparatus and of potential heat energy owing to the low efficiency at the generating end, and the costs of, and losses in, transmission.

Optimism and Its Check.

Glasgow's Business-Getting Policy.

Just now Glasgow is being put forward in the electrical press as an example to all other electricity supply undertakings that are not equally progressive in their domestic business policy. Of course, Glasgow, owing to its very size and density of population, and therefore of business opportunities, has advantages which cannot be rivalled by the cities and towns supplied by many other electricity undertakings. One should always take this into account when considering comparatively questions of suitable policy. It is very easy to say that one undertaking should do what another is doing; it is not always so easy for an undertaking in different circumstances to perform it. "Electrical Industries," in a special article, calls attention to the business-stimulating policy of the Glasgow Electricity Department. It mentions that, for the purpose of encouraging domestic consumption, the Corporation have introduced the low rate of 1d. per unit for purposes other than lighting. How many undertakings can honestly afford to supply current at 1d. per unit for any purpose in these times? However, Glasgow is now proposing to go a step further with the object of inducing the use of current in the new housing schemes. They propose to charge a fixed sum of £5 per annum and ½d. per unit. For houses of three apartments, it is intended to charge £3 18s. per annum, or 1s. 6d. per week; for four apartments, £4 11s., or 1s. 9d. per week; and for five apartments, £5 4s., or 2s. per week—in all cases, *plus* ½d. per unit. From our knowledge in the gas industry of the views of people who occupy such residences, they are not of a class which will look with kindly favour upon these lump payments. Our contemporary gives the approximate total figures of electric appliances actually in use now in Glasgow: Fires, 13,000; irons, 8000; kettles and other small appliances, 2500; vacuum cleaners, 1200; cookers, &c., 800; electric vehicles, 60. Considering the number of fireplaces there are in the city (including offices), 13,000 "fires" is not wonderful; and the number of 800 cookers is not strikingly large. And what does the term "cookers" comprise? Most electricity undertakings inflate the number of "cookers" with such things as grillers, toasters, and so forth. And now the Department are busy with a scheme of hiring-out 200 cooking stoves, to ascertain the effect. We have said something before about this piece of enterprise. After all, we repeat there is nothing conspicuously good about all this, in view of the size of Glasgow.

Lowering the Percentage Increase in Charge.

The better placed electricity concerns continue to decapitate the percentage increases that were made in the charges for current during the war. But some of them appear to be paying more attention to the lighting prices than to the power and heating ones. The reason for this is probably that before the war the latter had got very much on the low side, particularly in respect of heating. At Salford, for example, it has been decided to reduce the percentage increase for lighting from 75 to 40 p.ct.; and for power, heating, and bulk supplies, from 100 to 65 p.ct. Therefore for these purposes the percentage increase will stand at 25 p.ct. more than lighting upon the pre-war tariffs. The ability to make these reductions is put down to the installation of modern plant and the scrapping of obsolete machinery. By the aid of the new plant, the reduced cost of coal, and the improvement in the quality of the coal, the cost of generation has been substantially reduced. What is happening in the electrical industry is happening in the gas industry. Gas undertakings are settling down to the easier conditions, and are gradually receding from the war and strike rates for gas; and under the beneficent facilities afforded by the Gas Regulation Act, they are introducing plant and methods which enable therms in the form of gas to be produced at a cheaper rate. Coal and oil costs, quality of coal, and reduced wages rates are all likewise making their contributions to the ability to reduce therm charges. Thus it is that the relative positions of the two industries are not changing in respect of the costs for potential heat units to the consumers. The advantage is on the side of gas; and nothing that is visible suggests that this advantage will be lost. The best of electrical engineers see no prospect of reducing the costs of generation much, if anything, beyond what the existing highest efficiency plants are doing; and many of those engineers cannot see that super-stations, with their heavy capital and maintenance costs for plant and expenses for transmission, are going to compensate for any slight generating cost reduction that may be made over that of the best of modern local plants. Time and experience help to change views, and that which was at one time so plausible as to be acceptable sometimes recedes from its position in the light of further practical consideration. It seems to be the case in respect of the super-station. Salford is of opinion that it can do quite well with its new plant without external help.

Should a Corporation Wire at Cost Price?

The Derby Town Council have had a discussion on the subject of wiring and the supply of fittings. One councillor, who evidently thinks the bulk of his fellow-members lack initiative and enterprise, proposed that the Corporation should undertake the work at cost price. He had not in view the question of justice to the outside contractors; but the development of the supply of electricity. It appears that in three months the output of the undertaking has dropped by 1¼ million units; but this, we take it, is only a passing phase—due probably to the fluctuation of industrial demand. But there were members of the Council who had a feeling that the action of the Corporation in doing work at cost price would not be justified by any improvement that it would effect in boosting-up the sale of current. They had also some feeling for the contractors; and the opinion existed that the scheme must involve the Corporation in a considerable financial commitment. The proportion of lighting current to the total output is only about 10 p.ct.; and

therefore, argued another member, the small additional business that would be secured by seeking for work at cost price would not be worth the public dissatisfaction which would result over the action of the Corporation. This, of course, is one of those questions upon which good argument can be advanced from both sides. But looked at broadly, what sort of domestic consumption is likely to be secured now from any proposal of the kind? It would be mostly domestic lighting; and what is being found by some electricity undertakings now is that many of the new consumers are so frugal with their consumption of current for lighting (and will not use it for any other purpose) that they are not by any means profitable. An undertaking would really be better without many of these consumers. The proposal was turned down by the Council; and the Corporation Electricity Committee will proceed with its business-getting along regular lines and not commercially irregular ones.

A City Breakdown.

There have again been several failures of current lately; and one that attracted a good deal of attention was that of recent happening on the Charing Cross Company's City section, which deprived an important area of its supply for some hours—anyway, Fleet Street considers itself part of an important area. These failures occur on the best of regulated systems. An event of the kind being possible on such a system as that of the Charing Cross Company, the same thing can happen elsewhere. No undertaking can declare itself immune from such happenings. The "Electrician," in a statement as to the nature of the accident, says that the primary reason for the breakdown was the failure of one of the trunk mains supplying the City area from the Bow generating station. The failure caused an arc to take place at the back of the E.H.T. bus-bars, resulting in a short-circuit between the bars. The damage was so extensive that it is difficult to say precisely what did occur; and it can therefore perhaps be better imagined than described. The immediate result was the breakdown of about 7000 KW. of plant; the load on the station at the time being something like 18,000 KW. Our contemporary points to the moral of having an adequate margin of spare plant to deal with any emergency of the kind. A large margin of spare plant would not have averted the primary cause and the immediate damage. It would, of course, have assisted in a speedier return to a full supply. Fortunately, the Company had new plant nearing completion; and this was quickly brought into running condition. But electrical plant in these days costs money; and a good many undertakings cannot afford to have capital lying idle in a big margin of plant. If they have such a margin, somebody has to pay for it, and for its normal unproductiveness. And who but the consumers?

Fatal Contact with an Electric-Light Wire.

In Mr. Scott Ram's reports, relating to the use of electricity in workshops and factories, there are seen records of deaths from electricity at common voltages; and cases have been reported of loss of life through defective circuits on private premises. On Feb. 4, a boy was killed in a bakehouse at Harehills, Leeds, through coming into contact with a live electric-light wire. A temporary wire had been run into the basement, where a new oven was being installed, and the holder of the electric-light bulb had become damaged. It is supposed that the boy attempted, with the current switched on, to repair the holder, using a chisel without a handle for the purpose. He was heard to scream, and then he collapsed unconscious. A doctor was sent for, but on his arrival the boy was dead. Electricians, with Mr. Scott Ram's reports before them, and cases of the above kind, are utilizing carbon monoxide in the attempt to gain business for themselves!

Probable Future of the Gas Industry in America.

Mr. J. B. Klumpp, of the United Gas Improvement Company, says that as long as the United States possess a plentiful supply of gas-making materials, in the shape of gas coal and gas oil, it will be very difficult to induce the regulating authorities, particularly those representing the municipalities, to realize that it is to their best interests to permit the manufacture and distribution of a low heating value gas. While he believes that the future gas for city distribution will be a gas of relatively low calorific value, consisting of a coal gas mixed with an uncarburetted water gas, using all the coke produced by the coal gas for the manufacture of the water gas, this seems to him unnecessary so long as there is available a quantity of oil at reasonable prices. Considering the thermal basis of charge in connection with American conditions, he says: "The English method of charging for gas by the therm has some merits, but as now applied does not seem to be the practical solution to meet the exigencies of to-day's inequitable rates; and unless a proper service charge and a proper demand charge are included, and the heat units that are paid for be proportionately included only in the commodity charge, the application of such a rate to American conditions is not practicable. The introduction of the latter scheme of charging for gas in any American city will be looked upon, by the gas men, as a most interesting project; and if we convince our regulatory authorities and the general public that this is the right method on which to conduct our business, I think a great step for the economic manufacture and utilization of gaseous fuel will be taken."

NATIONAL GAS COUNCIL.

Meeting of the Central Executive Board.

A Meeting of the Central Executive Board of the National Gas Council was held on the 10th inst. at No. 30, Grosvenor Gardens. In the absence of Mr. D. Milne Watson, the chair was taken by Mr. Alderman F. S. PHILLIPS, J.P. (Vice-Chairman).

GAS REGULATION ACT, 1920.

Form of Annual Accounts.—It was reported that, pending the issue of rules under section 15 of the Act, the existing form of accounts and the requirements with regard thereto remained in force. As the Board of Trade had promised carefully to consider any suggestions put forward, a small representative Committee was appointed by the meeting in order to consider the form that future accounts might take.

Power of the Board of Trade to make rules for Appeals, section 16.—Draft rules under section 16 of the Act, submitted to the Council by the Board of Trade for their observations, were considered, and suggestions made. After considerable discussion, it was decided that these suggestions should be left to the officers of the Council to take up with the Board of Trade.

BOARD OF TRADE RETURNS.

The proposal of the Treasury to discontinue the publication of Board of Trade returns relating to statutory gas undertakings was reported. In view of the fact that these were the only official figures extant, and as such were of great importance to the gas industry in general, it was decided to impress upon the Board of Trade the vital necessity of continuing the publication of these returns.

SOUTH WALES ELECTRICAL POWER DISTRIBUTION COMPANY'S BILL.

The steps taken by a number of gas undertakings in South Wales in lodging a joint petition against this Bill were reported and approved. Clause 13 of the Bill would have the effect of authorizing local authorities to subscribe to the capital of the Power Company.

SUPPLY OF ELECTRIC CURRENT FOR LIGHTING PURPOSES BY CERTAIN ELECTRICAL POWER COMPANIES.

Counsel's opinion on this matter was submitted, and considered. He advised that the electrical power companies in question were acting *ultra vires* in supplying any energy whatever for lighting.

CARBON MONOXIDE.

The policy of the Council with regard to the misleading statements appearing in the public Press concerning carbon monoxide was reported, and the Central Executive Board approved the steps which it had been decided to take in order to cope with the propaganda.

SAFEGUARDING OF INDUSTRIES ACT.

Gas-Mantles.—The further steps taken by the Council in this matter were reported. It was reported that, at the request of the Incandescent Mantle Manufacturer's Association, the Referee had decided to state a case for the Court under section 19 of the Arbitration Act, 1889.

Domestic, Illuminating, and Mounting Glassware.—Further evidence by the Council given at the inquiry on Jan. 11 was reported.

APPOINTMENT OF GAS EXAMINERS.

It was reported that the Committee appointed by the Council in regard to this matter had met on Jan. 31, and had made certain recommendations with regard to amending the memorandum issued by the Gas Referees. These had already been submitted to the Gas Referees, and a deputation from the Council to the Gas Referees was announced for the 21st inst., when further suggestions would be put forward.

RAILWAY RATES.

It was reported that the Council had requested the railway managers to receive a deputation, on the ground that the recent reductions in railway rates on coal, coke, &c., were inadequate. Co-operation with the Mining Association and also with the National Association of Coke and Bye-Product Plant Owners was reported.

SPENT OXIDE.

It was reported that all the districts had not yet sent in their views on the policy to be adopted regarding the disposal of spent oxide. It was decided to obtain information from members of the Council as to the price obtained for the spent oxide produced, and the price paid for acid at makers' works.

Gas Heating of Stores.—A new issue by the British Commercial Gas Association of "A Thousand-and-One Uses for Gas" [No. 96] deals with the heating of stores and drapery establishments. It contains some very fine photographs of the interiors of well-known stores, and shows the various types of gas and coke heating appliances used for making these large buildings comfortably warm during the winter months. There is also practical advice on the heating of shops, board-rooms, and offices.

INSTITUTION OF GAS ENGINEERS.

Council Meeting.

A Meeting of the Council of the Institution was held at No. 28, Grosvenor Gardens, Westminster, on Monday, the 13th inst.—the President (Mr. Thomas Hardie) in the chair.

RECENT LOSSES.

After the usual preliminary business, the President made feeling reference to the deaths of M. Prosper de Lachomette, of Lyons, Mr. John West, of Southport (hon. members); and of Mr. Isaac Carr, of Widnes. As a mark of respect to their memory, the Council rose from their seats.

CANDIDATES.

The following were approved as candidates for the next ballot: For the class of member: Mr. George Hamilton, Engineer and Manager, Barrhead Gas Company; Mr. Francis Matthews, Chief Engineering Assistant, Bournemouth Gas and Water Company; and Mr. William Phillips, General Manager and Engineer, Luton Gas Company. For the class of associate member: Mr Hermon G. Higgs, Works Chemist, Salisbury Gas Company.

PUBLIC WORKS, ROADS, AND TRANSPORT CONGRESS.

A letter was considered from Brig.-Gen. Sir Henry P. Maybury, Chairman of the Organizing Committee of the Public Works, Roads, and Transport Congress (on which Committee the Institution are represented) conveying the following resolution:

> "That, in view of the importance and extent of the duties with which local authorities and their officials are now entrusted, and the consequent great advantage of provision being made for the periodical discussion of the methods by which such duties may be most efficiently and economically carried out, the Organizing Committee of the 1921 Congress desire to make a unanimous recommendation that, for this purpose, a permanent Congress Committee, consisting of the members of the Associations of Local Authorities and the Societies and Institutions of officials of Local Authorities now represented, together with such other bodies and persons as they may consider it advisable from time to time to co-opt, be established for the purpose of organizing a Public Works, Roads, and Transport Congress in 1923, and every two years thereafter, concurrently with the Public Works, Roads, and Transport Exhibition, on the understanding that no financial responsibility is thereby incurred by any of the Associations, Societies, or Institutions concerned."

The Council agreed that the Institution should continue to be represented on the Organizing Committee, under the terms of the resolution.

PROPOSED ADOPTION OF LOOS.

The report was presented of the Institution's delegates of a meeting held in connection with the proposed adoption of the town of Loos by British Engineering Institutions and Societies. A further meeting is to take place after information on the subject, which is now being awaited, comes to hand.

CARBON MONOXIDE AND GASSING CASES.

The action which had been taken by the Emergency Committee with reference to the question of carbon monoxide in gas was reported and approved. It was decided that a circular letter should be issued to the members of the Institution, with the object of obtaining the fullest particulars of every case of gassing, and advising that the construction, maintenance, and operation of mains, services, fittings, and appliances be carried out in such a way as to make accident from leakage practically impossible.

DATE OF THE ANNUAL MEETING.

The date of the annual meeting, to be held in London, was fixed for Tuesday to Thursday, June 20 to 22. On the latter date, the Société Technique de l'Industrie du Gaz en France will be received; and a visit of the Institution and their French guests to the Beckton works of the Gas Light and Coke Company will take place on the following day.

The report of the Finance Committee was presented, accepted, and adopted.

A Meeting Room at Westminster.—Our readers are now well aware that the central organizations of the gas industry are now located at No. 30, Grosvenor Gardens. We have received from the Honorary Secretary to the House Committee (Mr. H. Jones) the following communication: "In view of the difficulty which is often experienced in engaging rooms for meetings in the Westminster district, it may be of interest to your readers to know that the fine new board-room on these premises may now be booked for meetings on moderate terms." Applications should be addressed to Mr. Jones, at No. 30, Grosvenor Gardens, S.W.

Gas in Relation to Heating.—The new President of the Institution of Heating and Ventilating Engineers is Mr. A. H. Barker, who, in his Presidential Address, outlined a new policy of co-operation with other and kindred societies. There was, he said, a tendency to become too narrow, as though the only things of importance were boilers, radiators, pipes, and fans. They must consider heating and ventilating more than heretofore in relation to architecture, hygiene, physiology, general science, and even law. They had recognized gas rather grudgingly; but they must make up their minds that much more would yet be heard of gas in relation to heating.

STEAMING STOP-END HORIZONTAL RETORTS.

Under American Conditions.

In a preliminary report on experimental work carried out in the gas plant of the Illinois Northern Utilities Company, at Mendota, Messrs. W. A. Dunkley, of the United States Bureau of Mines, and R. D. Leitch, of the Illinois State Geological Survey, deal with investigations undertaken with a view to obtaining more definite information concerning the steaming of horizontal retorts. The experiments were conducted on a bench of six retorts, the testing period extending over about four weeks—two weeks with steaming, and two weeks without. With stop-end retorts, as at Mendota, it seemed impracticable to admit the steam at the rear end of the retort, as this would have involved drilling a 2-ft. brick wall, as well as the retort-setting. In the method adopted, therefore, the steam-pipe enters the retort through a hole in the side of the mouthpiece. The steam is carried by the pipe to the rear of the retort, and thus superheated. The pipe then turns back towards the front of the retort, and the steam passes out, and up through the hot coke. The ¾ in. distributing pipe lies on the floor of the retort. It is said that ordinary wrought-iron pipe will last from two to three weeks under these conditions. It gradually oxidizes, and becomes brittle. With ordinary care, the pipe does not interfere in any way with the charging and discharging of the retort.

The comparative analyses of the cokes produced with and without steaming show that with practically the same percentages of fixed carbon on a moisture-free basis, the coke from the steaming process contains less volatile matter than the coke produced without steam, though the coals used had nearly the same volatile matter and fixed carbon contents on the dry basis. The analysis of the gas from steaming indicates a slightly higher percentage of illuminants than the gas without steaming, despite the dilution with the water-gas constituents. It appears, therefore, to the writers that the steam during the distillation has a scavenging action on the unsaturated hydrocarbons, removing from the coke volatile matter which otherwise would have remained in it, and possibly preserving from decomposition part of the illuminants which would otherwise have been broken up. This, they say, possibly explains the reason for the diminution of carbon formation on the walls of the retort, frequently attributed to steaming. Steaming resulted in a small increased yield of gas; but the real comparison is between the amounts of heat equivalent yielded to the gas per pound of coal. In this respect, the report points out, steaming appears to have some advantage, since the gain with steaming amounted to 4·25 p.ct. of the total heat in the gas obtained without the use of steam. The average gas yield per pound of coal (corrected) was 5·77 c.ft. with steaming, and 5·48 c.ft. without steaming; the heating value of the finished gas being 553 B.Th.U. per cubic foot with steaming, and 559 B.Th.U. without steaming.

It was not possible in the Mendota plant to steam the retorts so heavily as would have been possible in an experimental plant, since the one bench of retorts in operation constituted the sole source of gas supply to the community, and it was not advisable to allow the quality of the gas to run at any time much below the prescribed requirements. With the light steaming practised, the computed make of water gas was 640 c.ft. per ton of coal throughput. The water gas make per hour of active steaming was 60·8 c.ft. This figure is admittedly considerably smaller than the results reported at some English plants where steaming has been tried; but in view of the generally lower calorific standards prevailing in England, it seems likely to the writers that the quality of gas made was lower than that made at Mendota. They conclude that the extent of the application of the steaming process must be limited greatly where standards of 565 B.Th.U. and thereabouts are prescribed, as is the case in most American States at the present time. In such circumstances, as a supplementary process for increasing gas output in a coal-gas plant, steaming does not appear to offer any possibilities. In a plant, however, which is not overloaded, and where during a portion of the time practically spent charges would lie inactive in the retorts, there seems to them a possibility of increasing the economy of operation by suitable use of the steaming process.

Brown Coals and Lignites.—At a meeting of the Royal Society of Arts (Dominions and Colonies and Indian Sections), on Friday afternoon of this week (Feb. 24), Prof. W. A. Bone, D.Sc., F.R.S. (Imperial College of Science and Technology), will read a paper on "Brown Coals and Lignites: their Importance to the Empire." The chair will be taken at 4.30 by Viscount Elveden, M.P.

Coke-Oven Practice.—Mr. R. H. Archer Coulson, of the Skinningrove Iron Company, lecturing at the Cleveland Technical Institute, Middlesbrough, last Thursday, on "Coke-Oven Practice," said that to ensure successful working, finely-crushed coal was necessary. Uniform heat in the oven walls was most important, as was also the regular drawing of ovens. The quenching of coke on the benches was also important. Mr. Coulson paid special attention to the recovery of bye-products, and referred to the Otto process, by which the gas from which the tar had been extracted passed into a saturator, where a hot saturated solution of ammonium sulphate, containing an excess of sulphuric acid, removed the ammonia from the vapour. Benzole distillation and scrubbing of the gas in towers in which constantly circulating creosote oil played the part of absorbent was also dwelt upon.

COMPARATIVE WORKING RESULTS OF THE THREE METROPOLITAN AND FOUR OF THE SUBURBAN GAS COMPANIES.

IN THE YEAR 1921.

Compiled by Mr. F. J. BRADFIELD, the Secretary of the Commercial Gas Company.

	Gas Light and Coke.	South Metropolitan.	Commercial.	Wandsworth.	South Suburban.	Tottenham.	Brentford.
Gas sold . . . . . thousands	30,382,532	14,282,021	3,590,627	2,881,263	2,903,679	2,610,502	4,438,461
Increase . . . . . per cent.	*Dec.* 4·95	·54	*Dec.* 8·39	*Dec.* 4·75	*Dec.* 1·30	*Dec.* 0·46	*Dec.* 1·39
Gas made per ton of coal carbonized. cubic feet	12,194	12,711	12,696	13,073	12,058	13,443	11,146
Gas unaccounted for . . . . . per cent.	7·56	4·82	7·02	7·94	7·49	6·60	5·97
Coke made for sale per ton of coal . cwt.	10·28	9·89	11·22	9·57	9·80	8·02	10·13
Tar made per ton of coal. . . . . gallons.	8·94	9·13	9·31	8·57	8·89	9·42	10·72
Liquor made per ton of coal . . gallons, 8 oz.	34·33	37·96	37·94	36·05	35·82	36·52	35·98
Percentage of coke used as fuel	18·12	19·33	16·92	19·14	21·62	35·21	18·73
Capital expended per 1000 cubic feet sold . . .	s. d. 9 7·76	s. d. 8 2·38	s. d. 8 5·01	s. d. 8 2·06	s. d. 8 11·81	s. d. 9 1·94	s. d. 7 7·95
Price charged per 1000 cubic feet	4/8 5/6	.. ..	4/8 5/6 ..	4/2 to 5/8	5/5 to 6/7	5/1 ..	5/4 ..
„ „ „ therm	— 14d.	10½d. 11½d.	.. 13⅝d. 15d	12d. to 16⅜d.	14⅜d. to 17⅛d.	13⅜d. 14d.	.. 14⅜d.
Costs per 1000 Cubic Feet of Gas Sold.							
REVENUE ACCOUNTS.	d.	d.	d.	d.	d.	d.	d.
Coals, oil, &c.	40·93	42·92 *b*	41·61	45·63	42·87	39·92	40·35
Less residuals—Coke and breeze.	16·95	19·46	15·52	15·45	14·88	12·64	10·95
Tar	1·76	3·90	2·60	2·92	3·62	2·80	3·28
Amm. liq. and sulph. amm.	1·02	1·56	1·71	·92	·69	·32	·15
Total residuals . . .	19·73	24·92	19·83	19·29	19·19	15·76	14·38
Net for coals, oil, &c. .	21·20	18·00	21·78	26·34	23·68	24·16	25·97
MANUFACTURE—							
Salaries	·57	1·67	·98	·95	1·23	·57	·99
Wages—carbonizing	4·25	4·35	4·03	4·46	5·15	4·40	4·52
Purification	·61	·94	·66	1·00	·86	1·06	·63
Repairs—plant	12·86	9·76	11·20	11·07	12·10	15·59	14·03
Net manufacture . .	39·49	34·72	38·65	43·82	43·02	45·78	46 14
DISTRIBUTION—							
Wages and salaries	2·66	2·05	2·51	2·42	2·75	1·65	2·31
Repairs—Mains and services, &c.	3·60	2·84	2·88	3·33	4·65	6·18	2·96
„ Meters and prep. meters and fittings.	2·41	5·82	5·52	4·23	4·43	3·43	2 45
„ Stoves—ordinary and prepayment .	2·13	2·41	2·77	4·27	1·92	1·50	1·84
Total net manufacture and distribution .	50·29	47·84	52·33	58·07	56·77	58·54	55·70
Public lamps—lighting and repairing	1·25	1·42	·91	·99	1·56	·56	·72
Rents, rates, and taxes	4·69	3·08	2·68	1·93	2·57	2·17 *g*	2·99
MANAGEMENT—							
Directors, Auditors, and salaries (Secretary, &c.)	·45	·50	·72	·66	·85	·59	·65
Collectors	1·30	1·75	2·10	1·24	1·29	1·21	1·12
Stationery and general charges	·76	1·21	·88	·92	·86	·70	·73
Profit-sharing	·51	..	·33	·17	·57	·17	..
Bad debts.	·07	·04	·04	·05	·04	·03	·05
Law and parliamentary charges	·02	·06	·14	·20	·06	·04	·04
Superannuations, Pension Funds, &c.	·68	·72	1·28	·30	1·50	·41	·62
National Insurance	·25	·37	·25	·27	·27	·23	·25
Active service allowances	..	..	·00	..	..	..	..
Sundries	·06	·07	·05	·02	..	..	·00
Total expenditure (*less* residuals) . . .	60·33	57·06	61·71	64·82 *e*	66·34	64·65	62·87
GAS.	63·55	58·51	63·62	63·81	67·45	61·71	65·95
Rentals—Meters and prep. meters and fittings.	3·69	4·33	3·40	3·74	2·94	1·87	4·52
Stoves	1·52	1·56	2·33	3·86	2·36	7·91	1·26
Incand. mantle maintenance . . .	..	..	·17	·42	..	·01	..
Miscellaneous	·24	·07	·01	·02	·06	·08	·05
Total—Gas, rentals, &c.	69·00	64·47	69·53	71·85	72·81	71·58	71·78
Balance, being profit	8·67	7·41	7·82	7·03	6·47	6·93	8·91
Dividend and interest	9·95	7·87	7·94	7·09	7·33	6·66	8·20
Surplus or deficit	*Def.* 1·28	*Def.* ·46	*Def.* ·12	*Def.* ·06	*Def.* ·86	·27	·71
Contributions to funds and sundry payments .	·16 *a*	..	..	·12 *f*	..	·07 *h*	·02 *d*
SUNDRIES.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Coals cost per ton	45 7·55	42 7·70 *c*	48 6·15	50 10·35	..	49 0·00	..
Coke realized per ton of coal	21 2·19	18 9·99	20 7·19	16 9·19	18 11·42	16 11·82	18 2·95
Coke „ „ of coke	41 2·72	38 0·88	36 8·79	35 0·67	38 7·95	42 4·34	36 0·45
Breeze „ per ton	13 8·09	10 5·24	7 7·97	8 6·54	6 1·77	5 8·39	10 11·39
Tar realized per gallon	0 3·25	0 5·10	0 4·40	0 4·79	0 6·32	0 4·92	0 5·65
Amm. liquor, &c., realized per butt (8 oz.) . .	4 5·44	4 4·93	6 8·91	3 5·18	2 8·13	1 4·43	0 9·34
Percentage of stoves at rental to consumers . .	73	..	79	102	112	72	93
Bad debts per cent. on total receipts	·08	·05	·04	·05	·05	·04	·06
Net profit per cent. on ordinary capital	3·67	4·59	4·06	4·74	4·38	6·03 *i*	6·32
Water gas, per cent. on total make	33·02	..	30·05	21·57	29·15	28·72	49·81

a Redemption fund. *b* Excluding 3·36d. carried forward. *c* Excluding 3s. 4·07d. carried forward. *d* Stamp duty.
e Capital duty eliminated. *f* Capital duty. *g* *Less* income-tax *Cr.* ·32d. *h* Expenses issue redeemable mortgages.
i Including electricity results.

COMPARATIVE WORKING RESULTS OF THE THREE METROPOLITAN AND FOUR OF THE SUBURBAN GAS COMPANIES.

STATEMENT SHOWING THE WORKING RESULTS AND THE REVENUE ACCOUNT COSTS PER THERM SOLD FOR THE YEAR 1921.

Compiled by Mr. F. J. BRADFIELD, the Secretary of the Commercial Gas Company.

	Gas Light and Coke.	South Metropolitan.	Commercial.	Wandsworth.	South Suburban.	Tottenham.	Brentford.
Declared calorific value . . . . B.Th.U.	475	550	475	470	460	450	460
Gas sold on declared calorific value therms	144,317,027	78,551,114	17,055,478 Therms sold	13,541,936 in 1920 not	13,356,922 available.	11,747,259	20,416,921
Increase . . . . . per cent.							
Gas made per ton of coal carbonized. therms	63·53	69·91 *b*	66·44	63·28	65·57	65·33	..
Gas unaccounted for . . . . . per cent.	7·56	4·82	7·02	7·94	7·49	6·60	5·97
Coke made for sale per ton of coal . cwt.	10·28	9·89	11·22	9·57	9·80	8·02	10·13
Tar made per ton of coal . . . . gallons.	8·94	9·13	9·31	8·57	8·89	9·42	10·72
Liquor made per ton of coal . . gallons, 8 oz.	34·33	37·96	37·94	36·05	35·82	36·52	35·98
Percentage of coke used as fuel	18 12	19·33	16 92	19·14	21·62	35·21	18·73
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Capital expended per therm sold	2 0·37	1 5·89	1 9·27	1 8·87	1 11·44	2 0·43	1 7·99
Price charged per 1000 cubic feet	4/8 5/6	.. ..	4/8 5/6 ..	4/2 to 5/8	5/5 to 6/7	5/1 ..	5/4 ..
„ „ „ therm	.. 14d.	10½d. 11½d.	.. 13⅝d. 15d.	12d. to 16⅝d.	14⅜d. to 17⅜d.	13⅝d. 14d.	.. 14⅜d.
Costs per Therm Sold.							
REVENUE ACCOUNTS.	d.	d.	d.	d.	d.	d.	d.
Coals, oil, &c.	8·62	7·80 *c*	8·76	9·71	9·32	8·87	8·77
Less residuals—Coke and breeze	3·57	3·54	3·27	3·29	3·23	2·81	2·38
Tar	·37	·71	·55	·62	·79	·62	·71
Amm. liq. and sulph. amm.	·22	·28	·36	·20	·15	·07	·04
Total residuals . .	4·16	4·53	4·18	4·11	4·17	3·50	3·13
Net for coals, oil, &c.	4·46	3·27	4·58	5·60	5·15	5·37	5·64
MANUFACTURE—							
Salaries	·12	·30	·21	·20	·27	·13	·22
Wages—carbonizing	·89	·79	·85	·95	1·12	·98	·98
Purification	·13	·17	·14	·21	·18	·23	·14
Repairs—plant	2·71	1·78	2·36	2·36	2·63	3·46	3·05
Net manufacture . .	8·31	6·31	8·14	9·32	9·35	10·17	10·03
DISTRIBUTION—							
Wages and salaries	·56	·37	·53	·51	·60	·37	·50
Repairs—Mains and services, &c.	·76	·52	·61	·71	1·01	1·37	·65
„ Meters and prep. meters and fittings	·51	1·06	1·16	·90	·96	·76	·53
„ Stoves—ordinary and prepayment .	·45	·44	·58	·91	·42	·34	·40
Total net manufacture and distribution	10·59	8·70	11·02	12·35	12·34	13·01	12·11
Public lamps—lighting and repairing	·26	·26	·19	·21	·34	·12	·16
Rents, rates, and taxes	·99	·56	·57	·41	·56	·48 *h*	·65
MANAGEMENT—							
Directors, Auditors, and salaries (Secretary, &c.).	·10	·09	·15	·14	·18	·13	·14
Collectors	·27	·32	·44	·26	·28	·27	·24
Stationery and general charges	·16	·22	·18	·20	·19	·16	·16
Profit-sharing	·11	..	·07	·04	·12	·04	..
Bad debts	·02	·01	·01	·01	·01	·01	·01
Law and parliamentary charges	·00	·01	·03	·04	·01	·01	·01
Superannuations, Pension Funds, &c. . . .	·14	·13	·27	·06	·33	·09	·14
National Insurance	·05	·06	·05	·06	·06	·05	·05
Active Service allowances	..	..	·00	..	..	..	..
Sundries	·01	·01	·01	·01	..	..	·00
Total expenditure (*less* residuals) . .	12·70	10·37	12·99	13·79 *f*	14·42	14·37	13·67
GAS	13·38	10·64	13·39	13·58	14·66	13·71	14·34
Rentals—Meters and prep. meters and fittings	·77	·79	·72	·80	·64	·42	·98
Stoves	·32	·28	·49	·82	·51	1·76	·28
Incand. mantle maintenance . . .	..	..	·04	·09	..	·00	..
Miscellaneous	·05	·01	·00	·00	·02	·02	·01
Total—Gas, rentals, &c.	14·52	11·72	14·64	15·29	15·83	15·91	15·61
Balance, being profit	1·82	1·35	1·65	1·50	1·41	1·54	1·94
Dividend and interest	2·09	1·43	1·67	1·51	1·59	1·48	1·78
Surplus or Deficit.	*Def.* ·27	*Def.* 0·8	*Def.* 0·2	*Def.* ·01	*Def.* ·18	·06	·16
Contributions to funds and sundry payments .	·03 *a*	..	..	·03 *g*	..	·02 *i*	·00 *e*
SUNDRIES.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Coals cost per ton	45 7·55	42 7·70 *d*	48 6·15	50 10·35	..	49 0·00	..
Coke realized per ton of coal	21 2·19	18 9·99	20 7·19	16 9·19	18 11·42	16 11·82	18 2·95
Coke „ „ of coke	41 2·72	38 0·88	36 8·79	35 0·67	38 7·95	42 4·34	36 0·45
Breeze „ per ton	13 8·09	10 5·24	7 7·97	8 6·54	6 1·77	5 8·39	10 11·39
Tar realized per gallon	0 3·25	0 5·10	0 4·40	0 4·79	0 6·32	0 4·92	0 5·65
Amm. liquor, &c., realized per butt, 8 oz. . .	4 5·44	4 4·93	6 8·91	3 5·18	2 8·13	1 4·43	0 9·34
Percentage of stoves at rental to consumers . .	73	..	79	102	112	72	93
Bad debts per cent. on total receipts	·08	·05	·04	·05	·05	·04	·06
Net profit per cent. on ordinary capital . . .	3·67	4·59	4·06	4·74	4·38	6·03 *j*	6·32
One fifth penny variation equals	£120,264	£65,459	£14,213	£11,285	£11,131	£9789	£17,014
Water gas per cent. on total make	33·02	..	30·05	21·57	29·15	28·72	49·81

a Redemption fund. *b* On declared value. *c* Excluding ·61d. carried forward. *d* Excluding 3s. 4·07d. carried forward. *e* Stamp duty.
f Capital duty eliminated. *g* Capital duty. *h* *Less* income-tax 0·07d. *i* Expenses issue redeemable mortgages. *j* Including electricity results.

A NEW HOLDER AT LEEK.

There was a large gathering at the Leek Gas-Works last Wednesday, including many neighbouring gas managers, to witness the formal bringing into service of a new 500,000 c.ft. spiral-guided gasholder and valve-house and works mains connections; the ceremony being performed by Mr. W. A. Furmston, J.P., the Chairman of the Leek Urban District Council.

The site upon which the new gasholder has been placed was purchased a few years ago by the Council, who recognized that in the near future additional storage would be required, for which there was no provision upon the existing land. It was further intended that workshops and a valve-control house should also be placed upon the new site. The land had been quarried for the sandstone rock; and it was found necessary to level the upper surface of the rock to receive the concrete bed for the gasholder tank.

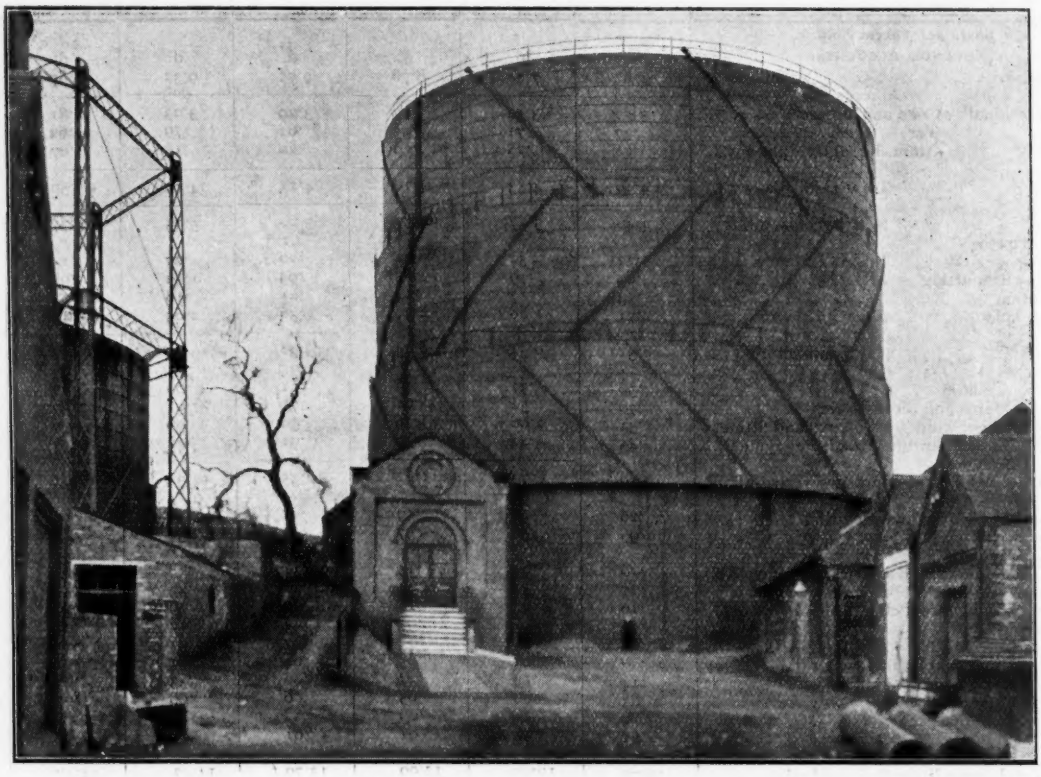
In the early stages inquiries were made regarding ferro-concrete tanks; but it was decided that, owing to the close proximity of the railway, a steel tank would be more desirable. The tank is 102 ft. 1½ in. diameter by 25 ft. 6 in. deep, and contains a three-lift spiral-guided holder having a capacity of upwards of half-a-million c.ft. The tank is entirely independent of any outside support; and there is sufficient space around it to permit of its being painted to its full depth. It is fitted with a balcony 2 ft. wide, of strong plates supported by angle-iron brackets. This balcony gives lateral stiffness to the tank curb, in addition to providing facilities for the inspection and painting of the holder. The brackets carrying the tank-carriages pass down the inside of the tank, to distribute the strain over the whole surface. The tank-carriages are of the "Bearscot" patent quadruple rolled type, all steel, every part being provided with lubricators. The control carriages on the dips of the holder are of the "Bearscot" twin-yoke type, being adjustable from the outside, and also fitted for expansion and lubrication.

The lifts are provided with run-down stops. The upper row of sheeting around all the lifts is extended above the curb or channel, to prevent any deposits flowing over the sides, and attacking the sheeting and painting; and heavier plating is provided in the upper and lower rows. The crown is carried by the latest system of support designed upon the roof-truss method, having circular bracket bars secured above the main bars instead of being fixed between. This ensures a perfectly spherical crown, with uniform riveting along the top curb; all the supporting framework being carried by the lower curb and vertical stays. The latter are kneed at the upper ends and secured to the table of the dip channels, to ensure these working level, and to relieve the load hitherto carried by the sheeting; and the usual continuous spiral plates are fixed behind each guide-rail, ensuring perfect contact and avoiding corrosion. Present-day pressure requirements often throw out of useful service the inner lifts of gasholders; and to ensure the full capacity of the new holder being available, the inner lift has been constructed to give 6 in. pressure.

Ladders are provided giving access to the balcony, cups and dips, and crown of the holder. Each cup and the tank are provided with two anti-freezers, together with the usual flexible steam tubing and fittings; and hand-railing is fixed round each dip to ensure safety of workmen, in addition to the guard-rail round the tank balcony and crown.

Owing to the recent water famine, though the holder was ready for service last October, the Council were, until recently, unable to provide the water for filling the tank. The foundations for the holder, together with the building for the valve-house, retaining walls, &c., were carried out by a local contractor; and all the ironwork in connection with the same was included in the gasholder contract.

The valve-house is 22 ft. 6 in. long by 15 ft. wide, having a height of 20 ft. from the cellar floor to the roof shoes. It is constructed with selected bricks having stone facings, and is provided with steel principals with wood purlins. The connections comprise two receiving mains 24 ins. in diameter, coupled to the various gasholders, and fitted with seven control valves 18 in. in diameter, having suitable indicators; and provision has been made for future extension. The interior of the building is suitably tiled; and a matched cast-iron movable grating provides the floor, so that any or all the valves can be inspected if desired. Entry to the building is obtained by means of a stone staircase; and all the latest ideas associated with the control and regulation of gasholder supply have been provided for. Considerable difficulties were encountered in coupling-up to the various gasholders and ensuring the usual supply pressures being maintained; but the work was accomplished without causing any inconvenience to the consumers.



THE NEW SPIRAL-GUIDED HOLDER AT THE LEEK GAS-WORKS.

The contract for the gasholder and gasholder valves and ironwork was placed in the hands of Messrs. R. & J. Dempster, Ltd., of Manchester; for the gasholder foundation and valve-house, together with brickwork and retaining walls, with Messrs. Grace & Sons, of Leek; while the contract for coupling-up from the valve-house to the various holders was placed with Gas Distribution, Ltd., of Nuneaton. The contracts were carried out to the drawings and specifications of Mr. R. H. Ginman, the Council's Engineer.

During an interval in the inspection of the gas-works, Mr. Furmston formally declared the gasholder open, and turned on the valve connecting the gas with the town.

THE LUNCHEON.

After the inspection, an adjournment was made to the Swan Hotel, where the guests were entertained to luncheon by Messrs. Dempster, upwards of sixty sitting down.

Alderman BROOKHOUSE (Stoke), after the Loyal Toasts had been honoured, submitted "Success to the Leek Gas Undertaking," and this was supported by Mr. J. OSBORNE (Ashbourne).

Mr. FURMSTON, in reply, said he thought the gathering that day marked an epoch in the long and interesting history of the Leek gas undertaking since 1828. When Leek was first lit by gas from the works in 1845, there had been very enterprising men on the Council, which

was then called the Improvement Commissioners; and they, as far-seeing men, purchased the undertaking from the Gas Company for £6194. The price of gas in 1828 was 12s. 6d. per 1000 c.ft.; and in 1845 it was 9s. 6d., with an output of 1½ millions. At the present time the output was 140 millions. The average price of gas in Leek for the last 22 years was 2s. 6½d. per 1000 c.ft., a price that would compare, including the period of the war and the aftermath of the war, with any other gas undertaking in the country. In 1913, the Leek Lighting Committee felt the absolute necessity of providing extra storage accommodation. The site of the Churnet Valley works was bought for £1000. The war intervened; and but for this the gasholder would have been put up for one-third of the present cost. He felt confident the money was not wasted. He was pleased to think that the Council had backed-up the Lighting Committee in the expenditure, which was a wise one, for though the output last year was not quite so big as the previous year, owing to the coal dispute, when normal times came, he was sure the necessity of the new gasholder would be clear to everybody. He hoped that next year the price of gas would be considerably reduced in Leek, and brought down to what it used to be. Mr. Furmston then paid a high tribute to the excellent manner in which the gas-works were carried on, and to the splendid co-operation existing between the Manager (Mr. Ginman) and his staff. He thought Leek had got a gas-works as efficient as any in the country. Mr. Ginman had been with them for eight years; and his work could not be too highly spoken of. The Committee and the Council had every confidence in him.

Councillor T. BIRCH proposed "The Contractors," and said they knew the difficulties of councillors; and no matter how they tried to please the public they could not give entire satisfaction. But in making these additions to their works they were following the examples set them by the far-seeing councillors of the past; and if the present Council were to carry out what they intended, they must keep on the line of progress. He congratulated the Contractors upon the way in which they had carried out the work.

Mr. C. Dempster left the response to Mr. J. W. SCOTT, who thanked the company for the way they had received the toast. He referred to other gasholders at Widnes, and stated that when the first four-lift spiral was erected there for the late Mr. Isaac Carr, at that time the firm with which he (the speaker) was associated were the sole makers of this type of gasholder. So Mr. Carr, in order to induce keen competition, prepared a design for a very economically guided holder, and forcibly informed him "that, though he was satisfied with his previous spiral, he was not going to give the firm the order unless they could show a saving in costs." The sequel to this occurred upon a similar occasion to the present one; for at the inauguration of the work, the chairman of a large corporation gas undertaking stated that such a holder might be possible for Widnes, but he should never be a party to the ratepayers' money of his town being so invested. Mr. Carr, in his reply, stated that he had gone to the trouble of designing a framed gasholder that embodied ideas which, if erected, would have remained as a perpetual monument to his skill. He, however, found that the saving shown by adopting a spiral did not justify him in asking the ratepayers at Widnes to find this extra capital, although, by so doing, he might have added lustre to his engineering ability. The speaker informed them that the corporation referred to did erect a guided gasholder, and it cost £250 to paint the framework; and under the present conditions of skilled labour and price of paint, this would doubtless be an ever-increasing yearly charge. The new gasholder they had inspected embraced all the latest improvements, some of which were introduced for the first time; and he was sure that it would prove as serviceable as the work the firm carried out for them in 1900, which he understood was still giving satisfaction. The gasholder was completed in October last; but the Council until recently were unable to obtain water to fill the tank. The holder would dispense with a good deal of Sunday work, which was an expensive item in these days. He was very pleased with the help he had received, and went on to congratulate Mr. Ginman upon being able to carry them through the last two winters, when he had such limited storage accommodation.

Mr. GRACE also responded, and said he hoped the gas undertaking would continue to progress, and that ere long Messrs. Dempster and Grace would be engaged on further additions.

Mr. A. MACKAY then gave "The Gas Engineer," and said he had not known Mr. Ginman very long, but during that short time he had formed the opinion that he was very capable of managing the gas affairs at Leek. With the way the works were run, he looked forward before long to gas being produced at a cheaper rate, especially as he saw their capital charges were only £300 per million, whereas in many places the amount was £450. He was pleased to hear of the co-operation of the employees and staff, because without the goodwill of the workpeople an engineer was helpless.

Mr. GINMAN, in responding, said he appreciated the kindly sentiments which had been expressed with regard to himself. He came to Leek in 1914; and he could truthfully say that since that time he had had the true interests of Leek at heart. Gas and electricity had worked together; and the latter department, from being a mere scrap-heap, was now classed by the Board of Trade Commission as first in Staffordshire and tenth in Britain. They had now one of the best tanks in the country, and a valve-house with the best brickwork for miles.

Illuminating Engineering Society.—A discussion on "Industrial Lighting: Ideal Requirements (Legislative and Otherwise) and Practical Solutions" will be opened by Mr. Leon Gaster at a meeting of the Illuminating Engineering Society at the Royal Society of Arts next Tuesday evening (Feb. 28).

Gasholder Design.—In "The Times" Trade Supplement dated the 18th inst., there is an article on "Gasholder Design," in which the writer deals with novelties in Continental practice. He says it would seem that the day of the gas-works without this familiar piece of apparatus is still far distant. So long as the daily consumption "curve" is not a perfectly straight line, so long must there be gasholders.

SELLING GAS BY THERMS.

[A Paper by Mr. S. T. S. Musgrove, of Sheffield, to the Yorkshire Junior Gas Association, Feb. 18.]

IMPORTANCE OF THE SELLING SIDE.

The selling side of our industry is rapidly becoming of equal importance with that of the manufacturing side; and if we are to expand our business and increase the output of gas, every available means must be utilized to stimulate its further use, more particularly among existing consumers. Despite all the propaganda work that has been done, it is still possible to find people who are quite unaware of the uses to which gas may be put, even in our large towns.

ADVANTAGES OF THE GAS REGULATION ACT.

The passing of the Gas Regulation Act and the sale of gas on a heat-unit basis confer quite a number of advantages on the selling side of an undertaking. Gas must be of a constant British thermal unit value (within certain limits). This is an advantage which enables the salesman to argue quite definitely with regard to consumption and cost. It must also be supplied at a minimum pressure; and if this minimum can be maintained constantly, it is an added advantage. These are two very important factors which should be of great assistance to the salesman. Personally, I think it is wise to inform the consumer of these facts, and also that the undertaking is liable to certain penalties if these regulations are not fulfilled. By this means, confidence in the concern is maintained, and the salesman is assured of an attentive hearing. The therm will soon be the recognized method of charging; and it is therefore desirable that all calculations should be on a B.Th.U. basis. It should be as simple to state, for instance, that a large inverted burner consumes 1750 B.Th.U. per hour as to say that it consumes 3½ c.ft. per hour.

Undoubtedly, the alteration in the method of charging has created among consumers a certain amount of suspicion which needs tactful treatment. Like most innovations, the public will not take kindly to it until it is explained to them in such a way that they are able to understand it; and this is not an easy matter. To measure the gas in the same manner by the same instrument and then to convert the measurement into other terms certainly does not appeal to the average consumer; and it will be a great step forward when it is possible to record B.Th.U. or therms direct instead of by conversion. Nevertheless, this scepticism of the consumer has to be overcome, and a beginning must be made with the selling and distribution staff. It is imperative that every official or employee whose duty brings him in contact with the general public should be able readily to explain: (1) What a British thermal unit is; (2) what a therm consists of; (3) the meaning of gas of a stated B.Th.U. value; and (4) the relationship between B.Th.U. or therms and cubic feet.

INSTRUCTION TO THE STAFF.

This can only be done by efficient instruction and explanation; and time spent in this way with fitters, meter readers, inspectors, collectors, salesmen, and showroom staffs is certainly beneficial. It is only by friendly discussion or debate that the new methods of measurement and charging can be thoroughly understood. The public, generally speaking, are aware that certain changes are taking place in our industry. They read in the newspapers that Committees have been considering the advisability of limiting the amount of carbon monoxide and inerts contained in town gas; and they make a point of asking the "gas man" about it. It is important that, whoever he is, he should be able to give an intelligent explanation.

The most frequent query is: "Why has the method of charging been changed?" Undoubtedly a ready reply to the effect that the method of charging has been changed in order to bring it into line with the method of use will usually prove satisfactory. It is absolutely essential that the value and meaning of the therm should be thoroughly understood by all employees of the gas undertaking who in any way come in contact with the public, in order that they may be able to pass on the knowledge. The sooner the public can grasp its true meaning and significance, the sooner will they realize the greater protection it affords to them. When the Gas Regulation Act is brought fully into operation, recording calorimeters will be installed not only on the gas-works, but also in various parts of the district, so that a continuous record of the B.Th.U. or heating value of the gas will be available, and will be regularly checked by the appointed gas examiner. The staff on the selling side of the industry must readily realize the protection this affords the consumer; and this knowledge must be passed on to the public whenever the opportunity offers. It is only in this manner that the consumer can be made to realize the very real protection that the Act affords him. The figures recently given in the annual reports of the two leading London Companies of the average B.Th.U. value supplied during the period under review are excellent examples of the way in which the Act is being carried out. In each case, the average B.Th.U. value supplied is in excess of the standard declared; so that the consumer is continuously getting full value for his money.

It is often asked why different values have been declared by different undertakings. It should not be difficult to explain that every undertaking is free to declare the B.Th.U. value most suitable to its requirements; but it must be borne in mind that

whatever the declared value, the therm remains a constant. It is, therefore, quite possible to compare the relative prices charged per therm by different undertakings.

The difference in volume can be readily ascertained, and is briefly shown in the following table:

B.Th.U. per C.Ft.		C.Ft. per Therm.	
500	..	200	Nearest whole number.
490	..	204	
480	..	208	
470	..	212	
460	..	217	
450	..	222	

It will be observed that the cubic feet contained in a therm vary according to the different declared values; and this is the point that is so puzzling to the public. This gives the salesman the opportunity to emphasize the fact that it is only the heat units in the gas that are paid for, and nothing else; and unless the heating value of the gas is up to the declared standard, and is continuously maintained at that standard (within limits), the undertaking is liable to be penalized. The salesman is therefore fully justified in asserting that the consumers' interests are more fully protected under the Gas Regulation Act than ever they have been before. This all points to the necessity of adequate instruction being given to the selling staff from time to time, not only on this point, but on all matters of interest to them. Employees on the distribution side should be encouraged to ask for explanation and advice on all points that arise in the course of their work which are not clear to them. It is sometimes found that with new appliances an employee may have a quite erroneous idea of the functions of certain parts, which could easily be corrected if an explanation were asked for. There is a big field yet undeveloped in most towns for the extended use of gas for all purposes.

Lighting.

In the realm of lighting, competition is very keen; but the continued improvement in fittings, burners, glassware, and shades enables us to more than hold our own, especially if the question of cost is a consideration. For factories and workshops, incandescent gas lighting is generally preferred. It is surprising to find the large number of premises in some towns that still retain the flat-flame burner. This is largely the result of the conservatism of the workers; but by quiet conversation and peaceful persuasion it is usually possible to obtain permission to put up a few incandescent lamps as an experiment, and invariably this leads to modernization of the whole premises to the satisfaction of both employer and employee.

The lighting of premises must be the subject of careful thought on scientific lines, so that the very best results may be obtained with the minimum of expense. This is particularly necessary in workshops and factories. A sufficient amount of diffused light must be available at all points, and care must be taken to avoid both bright patches and dark shadows. This often requires considerable alteration; but with patience and care the required results may be obtained, and the workers are usually very quick to appreciate a well-lighted workshop.

Cooking.

For cooking purposes gas is far ahead of all competitors. The increased efficiency of modern cooking appliances of all descriptions is readily appreciated by the public, and is a fruitful source of income for all gas undertakings. In Sheffield, the use of the gas-cooker is at present somewhat limited, as the ordinary small class dwelling-house has no scullery, and consequently it is difficult to find a place for the cooker in the kitchen. This has lead to the introduction of gas into the existing coal-range oven by means of an "oven square," which consists of a piece of $\frac{3}{8}$ in. wrought-iron tube bent to fit round the back and sides of the oven, into which are screwed small luminous flame burners spaced about $\frac{1}{4}$ in. apart. An attachment, consisting of a light cast-iron frame, is fixed to the top and side of the oven door, to enable the products of combustion to pass away. This is a very inexpensive yet satisfactory method of heating the oven by gas, and, together with a hot-plate on the hob or other suitable position, is an excellent substitute where want of space prevents the use of a gas-cooker.

For canteen and hotel work, the experience gained during the war with gas apparatus for cooking and water heating on a large scale was so satisfactory that most of the appliances have been retained; and wherever extensions are in hand or contemplated, the salesman is usually able to obtain orders for further appliances of a similar character.

Heating.

Gas fires and heaters may now be obtained in design and size to suit all classes of consumers; and the demand for these appliances at this season of the year is evidence of the increasing popularity of this method of heating. Hot water or gas-steam radiators are also a "selling line" where churches, public buildings, workshops, &c., are concerned. Their installation is simple and easily carried out, and they are completely satisfactory in every way. Garages and greenhouses may also be safely and economically heated by gas.

Water Heating.

Gas water-heaters, of both the geyser and circulator type, are being recognized as useful adjuncts to all modern domestic establishments; but care must be taken to see that the most suitable type of apparatus is recommended.

Suitable Salesmen.

This emphasizes the necessity of employing qualified men only as salesmen. There is no doubt that if the sale of gas is to be extended, particularly among existing consumers, the public must be constantly informed of the uses to which gas can be put, and the various appliances must be brought to their notice. This can only be done by systematic and continuous canvassing by competent men who have a firm belief in the goods to be sold and who are able to give reliable and truthful information concerning the various appliances on the market. The salesman must be well informed in all such details as consumption results to be obtained, and must be able to give a good reason for recommending any particular appliance.

The public, generally speaking, have very little idea of the size of appliance necessary for any particular purpose; and it is essential that the salesman should be able to supply this information, knowing that, if his advice is followed, satisfactory results will be obtained. While well-aware of the excellent work being done by the "B.C.G.A.," I still feel that it needs the personal touch of the local representative if the results anticipated are to be obtained. Consumers are intensely interested in all labour-saving devices, but rarely consider that the showrooms and offices of the gas undertaking are the places to find such things. It can, however, be readily pointed out by an enthusiastic salesman that the gas undertaking is probably the largest vendor of labour-saving appliances in the neighbourhood. It is only necessary to mention a list of appliances to be found in use in an "all-gas" house to enable us to realize the silent revolution which the use of gas has brought into our homes.

Showrooms.

The value and usefulness of a well-arranged showroom cannot be exaggerated. The fittings and apparatus should be attractively and tastefully displayed. As many appliances as possible should be connected-up, and so connected that they may be readily detached and any other appliance fixed, so that the public are able to judge of the appearance of a fitting or appliance in actual use. A frequent change of appliances in the windows is desirable; and if it is possible to connect apparatus and put it to actual use, it should certainly be done, as this is a never-ending source of attraction, and compels attention from all classes of the community.

Suitable literature may be displayed illustrating the appliances for sale or hire, and the general "atmosphere" of the showrooms should be such that the consumer feels free to make a casual or detailed inspection of any appliance which may specially attract attention. Every effort should be made to induce consumers constantly to visit the showrooms in order that their attention may be called to new appliances. A prominent position may be given to any announcement of a reduction in the price of appliances when this takes place, as undoubtedly the initial expense of gas apparatus has in some instances prevented its installation.

Inspection of New Appliances.

It is a usual practice in most undertakings for the salesman, after a suitable interval has elapsed, to call on consumers who have had additional appliances installed, to inquire if they are giving satisfaction. This frequently gives the opportunity to ascertain if the appliance is being used in such a manner as to give efficient and economical results, and enables the consumer to feel that the undertaking has a "personal" interest in all the appliances which it supplies. With cooking apparatus, it is sometimes found that a little elementary instruction is necessary in order that complete satisfaction may be given. This instruction may be augmented by a series of cookery demonstrations at suitable times during the year, under the guidance of a fully qualified teacher. These classes usually prove an excellent advertisement, as the ladies who attend may be relied upon to make more use of the gas-cooker as their knowledge of its capabilities is extended.

Obsolete Appliances.

It is necessary for the salesman to keep a sharp look-out for all obsolete and unsuitable appliances. It is surprising how consumers become attached to old lighting fixtures, such as the water-slide chandelier or the old pattern gas-fire with no means of adjustment and with ball fuel. It should not be difficult for the salesman, by the exercise of tact, to point out how uneconomical these appliances are, and how the cost of new ones may soon be saved by the increased efficiency and better service which it is possible to obtain.

Industrial Gas.

While the domestic side of our business in most places is of primary importance, it must be apparent that, in an area such as is covered by this Association, there is really great scope for the development of an industrial load among the manufacturers who come within our limits of supply. It is interesting to note that in the final report of the Committee on Smoke Abatement, it is stated by the two representatives who visited the industrial cities of Germany that gas-furnaces for metallurgical purposes are used to a far greater extent there than in this country. This should be an incentive to us to renew our efforts to extend the use of gaseous fuel for all industrial purposes. These remarks apply with equal emphasis to American practice.

This all goes to support my statement that there is big business to be done industrially by the persistent canvassing of manufacturers and by practical demonstration of the possibilities of

gaseous fuel. It must never be forgotten that only the fringe of the industrial business has been touched, and new problems come along for solution almost daily. It is not so very long ago that the efficiency of the average gas-furnace was about 27 p.ct., whereas to-day 40 p.ct. efficiency may be safely taken; and this latter figure I feel sure will be continually improved upon. Practically all industries require heat in some form, and in nearly every case gas can supply that heat.

We are constantly told that gas is expensive in comparison with solid fuel. This in some cases may be correct; but when the many attendant advantages are considered, it can still be proved that the over-all cost will bear favourable comparison with any other available fuel. It may not be out of place to state a few of the advantages which the gas-furnace may claim:

(1) It occupies one-third the ground space of a solid-fuel furnace, and requires no expensive foundation or lengthy chimney.
(2) No space is required for storage of fuel, and no ashes or clinker need removal.
(3) The position of the furnace is not limited in any way, as the fuel supply can be readily carried to any point.
(4) It is available instantly by the turning of a tap.
(5) Work may be completed more quickly and accurately than with solid fuel, as the heat is under complete control.
(6) The initial cost is usually considerably less than that of its solid fuel prototype.

In Sheffield, the home of the steel industry, this branch of the business has been, and is still being, further developed. A furnace demonstration room is an important part of the sales department. This is in charge of a specialist who is familiar with the various processes of the heat treatment of steel in all its stages, and is competent to advise on all matters relating to gas-furnaces. A variety of furnaces may be seen in operation, and manufacturers are encouraged to bring to the furnace room any class of work which needs heat treatment, so that the time occupied can be readily ascertained, the amount of gas required to obtain the requisite temperature, and also the quantity required to maintain that temperature for a given period. In this way much useful information is obtained and recorded, so that it is available at any time. In this manner we are able to bring the possibilities of gaseous fuel to the notice of all those interested.

Gas for Power.

The use of gas for power purposes provides a lucrative field for investigation. The gas-engine is undoubtedly one of the most reliable and economical power units on the market, and in most works and factories where power is necessary it can be recommended with confidence. It is being increasingly used as a prime mover for the generation of electricity, particularly in cinemas.

Gas in New Buildings.

While it is necessary to extend the use of gas among existing consumers, in nearly every district there are many opportunities for business in the new buildings that are being erected. It is important that architects and builders should be persuaded to instal piping of such a size as will enable an adequate supply of gas to be available for all possible purposes. With this end in view, salesmen should keep a record of all building developments. These may be obtained from a number of sources—for instance, from the particulars of plans approved by the local authorities, announcements culled from the newspapers, or from information supplied by house agents. Suitable literature may be sent to those interested, to be followed by a personal call from the salesman, when details may be discussed. In this way, architects or builders are brought into personal contact with the gas salesman; and it is my experience that advice is often sought, and the information given is appreciated and business results. The question of cost, while of importance, is not always the deciding factor, as it is frequently sufficient to point out the utility, convenience, and reliability of gas appliances to ensure their installation.

Complaints.

The salesman should always have an attentive ear for complaints. It must ever be borne in mind that the average consumer still knows very little about gas and the apparatus for using it. The adjustment of a burner, be it for lighting, cooking, or heating, is considered a delicate and, by some, a dangerous operation; and it is only by personal demonstration that this can be overcome. The salesman who can "put a burner right" is assured of an attentive hearing, and the knowledge of his "usefulness" soon spreads throughout the neighbourhood, and often enables him to obtain admittance to a house where otherwise it would be difficult.

Advertising.

Seasonal advertising in the local Press is of material assistance to the salesman, and often brings inquiries from quite unexpected quarters. It is necessary that the undertaking should be constantly before the public, and the newspapers and periodicals are undoubtedly the best means of attaining this object. Illustrations, accompanied by suitable written matter, seldom fail to attract attention, especially if a particular space in a paper is taken and a different type of appliance is "boomed" at regular intervals. The whole object of advertising should be so to attract the public that they will be compelled to visit the showrooms or offices of the undertaking, even though it may be only to see the latest appliances and notice any improvement that may have been made.

Maintenance.

It should be emphasized that periodical maintenance of all appliances, both domestic and industrial, is necessary if continued satisfaction is to be obtained. The regulation and adjustment of burners, the cleaning of flues, the replacement of defective parts, &c., all tend to give the consumer the impression that it is the aim of the undertaking to give satisfactory service at all times; and this will always enable the salesman to introduce further appliances. Finally, we are all aware that the continual improvement in construction, design, and efficiency of all classes of gas apparatus enables the salesman to look forward with confidence to the future, knowing that the goods he sells, if properly installed and used, will always give complete satisfaction. Where this "atmosphere" obtains, the use of additional appliances may be looked for to the advantage of the consumer, the undertaking, and the country generally, for the more gas that is used both for domestic and industrial purposes the healthier will our cities and towns, together with their inhabitants, become.

[Our report of the discussion is unavoidably held over until next week.—Ed. "G. J."]

PERHYDROL IN GAS ANALYSIS.

[From the "Chemical Trade Journal."]

Most of the methods for the determination of the total sulphur in illuminating gas depend upon burning a measured volume of the gas, absorbing the products of combustion, and estimating the sulphur compounds formed, either gravimetrically as barium sulphate, or volumetrically, or according to Winkler's method.

In all these combustion methods one source of error is liable to creep in, in spite of all the care which may be exercised in carrying out the estimation. There is always the possibility that the liquid used as the sealing fluid may either dissolve-out sulphur compounds from the gas or, on the other hand, that the gas may absorb additional traces of sulphur compounds from the liquid.

A. Klemmer (in the "Chemischer Zeitung" for Jan. 24 last) proposes the use of highly concentrated hydrogen peroxide (perhydrol) for the estimation. When high percentage hydrogen peroxide is mixed with moderately concentrated caustic soda solution, a thick crystalline precipitate of the composition $Na_2O_2 + 8H_2O$ is formed. This body is a very powerful oxidizing agent. Sulphuretted hydrogen, and also carbon oxysulphide, are oxidized to sulphuric acid. Carbon bisulphide and the mercaptans also give a quantitative yield of sulphuric acid. Thiophene, however, is not oxidized under the same conditions; but its quantity in illuminating gas is so small that the error caused by its escaping oxidation is insignificant.

The method of carrying out the estimation is to mix 10 c.c. of perhydrol and 80 c.c. of 40 p.ct. caustic soda solution. A thick crystal broth is immediately formed; and this is introduced into a suitable gas wash-bottle. The gas is passed through the bottle at the rate of about 100 litres per hour. After 100 litres have been passed through the oxidizing mixture, the contents of the wash-bottle are transferred to a 500 c.c. beaker, acidified with hydrochloric acid to destroy the excess of sodium peroxide, boiled to eliminate all free hydrogen peroxide, and the sulphuric acid finally precipitated as barium sulphate with hot barium chloride solution.

British Non-Ferrous Metals Research Association.

Engineers, who are among the largest users of non-ferrous metals, will recognize the important work being conducted by the British Non-Ferrous Metals Research Association, of No. 71, Temple Row, Birmingham, who have just issued their second annual report. The Association have a membership of over a hundred firms all over the country, including both manufacturers and users of non-ferrous metals. The researches in progress are of a very varied character, and are in many cases of national importance. Apart from investigations of particular value to the non-ferrous industry itself—such as those on brass casting and on the influence of impurities on the working properties of copper, which latter is being conducted at the National Physical Laboratory by Dr. W. Rosenhain—investigations of more general interest to engineering firms are those on metal polishing and grinding, and on the jointing of metals. The electric melting of non-ferrous metals is also receiving attention; and the Association are performing a public service in conducting their important work on the atmospheric corrosion of non-ferrous metals. The report is a reassuring indication that the value of research is being more generally recognized by British manufacturers.

The late Mr. Herbert J. Waterlow, of Gloucester Terrace, Hyde Park, who was Deputy-Governor of the Gas Light and Coke Company, has left estate of the gross value of £6519.

The Association of Engineers-in-Charge are holding an informal discussion on Saturday evening, Feb. 25, at 7.30 p.m., at St. Bride's Institute, Bride Lane, Fleet Street, E.C. 4, to discuss "Mechanical Stokers *v.* Hand Firing, both with Forced Draught." Visitors are invited to be present and take part in the discussion.

LOW-TEMPERATURE DISTILLATION OF A COAL AND OIL MIXTURE.

In the notice in last week's "JOURNAL" of the Fuel Research Board's revised edition of Special Report No. 1, on the subject of "Pulverized Coal Systems in America," by Mr. L. C. Harvey, reference was made to the "Trent" distillation process, in which the fuel to be used is first ground, and then a quantity of oil is added; the resulting "amalgam" being afterwards subjected to low-temperature distillation. Messrs. J. D. Davis and C. E. Coleman, of the Pittsburgh Experimental Station of the United States Bureau of Mines, reporting upon the subject, remark that during some experiments conducted in co-operation with the Trent Process Corporation, it was observed that amalgams of heavy petroleum oils and finely pulverized coal tended to produce a denser coke than that obtainable from the coal when retorted alone. The term "amalgam" is used in its broadest sense to designate an intimate mixture of materials—in this case, approximately 70 parts of finely pulverized coal and 30 of oil. Even anthracite coal, when retorted with oil, yielded a coke. This led the writers to believe that, by mixing a low-rank coal (sub-bituminous, or even lignite) with asphaltic oil, and retorting it, a coke suitable for domestic fuel could be made. Thus there was contemplated the production of domestic coke and the utilization of a low-grade oil in one operation. The amalgams were distilled to a temperature of 600° C.; being charged into a cold retort, which was slowly heated, and then maintained at 600° until gas was no longer evolved. Samples of the coal and oil used were then distilled separately under the same conditions. On comparing the products, the following conclusions were reached: Under the distillation conditions prevailing, the amalgam yields only about half as much tar oils as its constituents. A lower yield of gasolene and kerosene stock is obtained for the amalgam. The residues obtained from the oil and coal were not coked, whereas that obtained from the amalgam was a coke of fair quality. The residue from the amalgam was 18 p.ct. greater than the combined residue from coal and oil. The amalgam yields over twice as much gas as the coal and oil distilled separately; and its heating value is 5 p.ct. higher. The total heating value of gases from one ton of amalgam was 6,109,000 B.Th.U., against 2,460,288 B.Th.U. for the combined gases from coal and oil.

Repairing Broken Mains During Flood.

Round about Christmas time and since, devastating rain-storms in the State of California seriously threatened the service of many public utility corporations. The Southern Counties Gas Company of California, writes Mr. Clyde H. Potter, in the "Gas Age-Record," with approximately 1300 miles of transmission mains stretching across five Southern California counties, connecting the distribution systems of 43 cities, apparently would face such a serious storm with some apprehension. Many of the transmission mains cross dangerous washes or rivers, and stretch over country in places where it would appear that a storm of such magnitude would endanger the service of many of the Company's 80,000 consumers. However, watchfulness and the maintenance of several emergency crews enabled the Company to emerge from the worst storm in 35 years with practically no interruptions of service on the entire system. The first serious break in a main occurred when the San Gabriel River tore away most of the El Monte bridge, then under construction, thereby severing a 4-in. high-pressure transmission line. This line, in addition to supplying El Monte, is a part of the Monrovia transmission system. The pressure at Monrovia dropped 50 lbs. in less than one hour, following the collapse of the bridge about 6 p.m. The construction force worked from then until 3 o'clock the next morning, when the break in the main had been repaired. The men had had to work in a drenching rain, and much of the time up to their waists in the river. The welders succeeded in welding the broken main, had fastened it to the abutment still standing in the river bed, and finished the work in a raging storm. Another break was in a 2-in. line, near Chino. When the storm started, this pipe was buried 3 ft. below the bed of the river; but the water tore the ground away. Now the repaired line is suspended 3 ft. above high-water mark. During the same storm, at a point a few miles from Long Beach, an 8-in. high-pressure line was threatened by rising waters; and men worked continuously for eighteen hours to prevent *débris* and logs from collecting against (and perhaps destroying) the bridge carrying the main.

"Practical Engineer" Pocket-Book.—There is just to hand from the Technical Publishing Company, Ltd., of Gough Square, Fleet Street, E.C., a copy of the thirty-fourth annual issue of the "Practical Engineer" Mechanical Pocket-Book and Diary for 1922, the price of which, in two styles, is 2s. and 2s. 6d. (post free 2s. 6d. and 3s.). For either of these small sums there is available a very large amount of information in the shape of tables and illustrated letterpress; but even so, it remains a pocket-book. Among nearly a score of sections, there is one on gas for heating and lighting, and another on gas and oil engines; but the contents from beginning to end of the book are of value to all practical engineers. This edition, it is stated, has been completely revised, in order to keep it up to date. Fresh data have been inserted in many places; and in the appendix semi-Diesel engines are on this occasion for the first time dealt with.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

"The Five-Legged Rabbit."

SIR,—It is very surprising to read Mr. C. B. Tully's evasive answer to a friendly criticism of his statement with regard to results he claims to have obtained from his latest plant. It is clear to everyone in the water-gas practice that Mr. F. D. Marshall's criticism is a very fair one, and that the matter was analyzed by him purely from the scientific point of view.

Perhaps I am not far wrong in thinking that Mr. Marshall's intention is also to catch a "hare;" and he is giving Mr. Tully the chance of putting his "game" in the field for a straight and fair run. So it is very disappointing to observe how the "quarry" dives with rabbit-like rapidity from the open field of "science" into the nearest burrow of "boiled-down finance."

I quite agree in the main with Mr. Marshall's figures; and I consider he is very liberal in his criticism—especially with regard to the temperatures of the "make" of gas and the "blow" gases leaving the generator, as in the actual practice they are considerably higher. As regards the gain obtained by the gasification of tar in the new Tully plant, this would give about 980,000 B.Th.U. on the basis of 10 gallons per ton, if "completely" gasified, less one-third if there is a residual carbon.

E. F. MURRAY.

25, *Burton Road, Brixton Road, S.W.*,
Feb. 19, 1922.

The Therm and Gas-Works Practice.

SIR,—I have been too busy to answer before now Mr. MacGregor's reply to my criticisms, and published in your issue of the 8th inst.

Your correspondent is on sound ground in the main points of his arguments; but I must maintain my position when dealing with the cost of production of therms. Mr. MacGregor has confused the profit per ton of coal handled with profit per therm of gas sold. I did not "appear to suggest" that the production cost per therm was the same in the two cases cited. I stated emphatically that this was the case, and accepted Mr. MacGregor's own figures in making the calculation; and as he has presumably checked the arithmetic, perhaps he will tell me where I am wrong. Alternatively, will he say what he calculated the net coal cost per therm by his two systems?

Your correspondent is not correct in stating that "if we double the output from the same amount of coal, our production cost per therm is halved." This statement ignores entirely the effect of the residuals. Any gas engineer or responsible official knows that he does not halve his net coal cost by increasing his thermal production from 60 to 120 therms per ton, if by doing so he loses part of his residual products. If Mr. Ford were in the peculiar position of selling "scrap" at the same price per ton as the original metal, it might pay him to make only one car from a ton of steel instead of three.

Earlier in his letter, Mr. MacGregor states "so that we may say that, for purposes of comparison, our total production costs are directly proportional to the quantity of coal purchased." This is where he is wrong; for the total cost of production of a therm is a much more complex affair than this. I venture to say that when Mr. MacGregor has had more experience in the making, distributing, and selling of gas under the Gas Regulation Act, he will modify his opinion.

Let us take a simple case of an undertaking like Derby, which in pre-war days obtained 90 to 98 p.ct. of its coal cost back in residuals:

(*a*) Coal costing £2 per ton, and 210 therms per ton produced.
Net coal cost = 2·3d.

(*b*) Coal costing £2 per ton, 95 p.ct. returned for residuals, and 70 therms per ton.
Net coal cost = 2s. for 70 therms.
= 0·34d. per therm.

This is admitted to be an extreme case in present conditions; but the principle is the same, and it illustrates my point that in certain conditions complete gasification would not produce cheaper gas.

Please allow me to say that I am not dealing with the many advantages which complete gasification offers. I am dealing only with the net coal and total production cost. I thoroughly investigated the results of several plants and their working results some 18 months ago, and was forced to the conclusion that, judged on the revenue account, and the possibility of cheaper gas for the consumers, I could not recommend its adoption—only in special circumstances; and these were circumstances which would approximate to Mr. MacGregor's basis of the cost of production—viz., where the residuals were of little importance.

ENGINEER.

Feb. 20, 1922.

Price of Gas in Mansfield.—Complaints have been general of late as to the high price of gas (5s. 6d. per 1000 c.ft.) at Mansfield; the question involving considerations of more than usual interest from the fact that Mansfield is situate in the midst of a district in which more collieries have been opened in recent years than in any other part of the Midlands. At the meeting of the Corporation on Friday last, Alderman Maltby expressed the hope that the Committee would do their best to make a reduction in the price, as the public had a right to expect. The point also arose, upon a question put by Mr. J. A. Beck, whether the Chairman was justified in having huge stocks of coal at a gas-works in view of the probability that the price in the immediate future would be considerably reduced. Mr. S. Spencer suggested the likelihood of a further reduction in miners' wages in March. Alderman Smith explained that only a three weeks' supply was at present being stored, which represented only half the provision made by most undertakings.

REGISTER OF PATENTS.

Separating Constituents from Coke-Oven and Like Gases.—No. 147,737.

No. 19,740; July 8, 1920. Convention date, Nov. 1, 1918.

STILL, CARL, of Recklinghausen, Germany.

This specification claims and describes:

1.—A process for separating the commercially useful constituents from coke-oven or like gases by the application of high pressure and absorption, which consists in treating the gas, which has been cooled to the surrounding temperature, freed from tar and compressed to a pressure of from 100 to about 200 atmospheres and has been cooled again under this pressure to about the temperature of the surroundings, with suitable physical or chemical absorption agents in such manner that the absorbed constituents of the gas are separated in small volume in highly concentrated condition—that is to say, in a dissolved form or in liquid or solid state—in nearly marketable condition.

2.—In the process referred to in Claim 1, the gases are subjected to a preliminary treatment in a partially compressed condition and at about the ordinary temperature with suitable absorbents, such as alcohol, which can dissolve to a certain extent some of the gas constituents, such as carbon monoxide, sulphuretted hydrogen, and methane, in order to diminish the proportion of such constituents in the mixture, so as to suit it for certain modes of further working it up or for certain applications.

3.—In the process referred to in Claims 1, and 2, the gases are treated in highly compressed condition with such a proportion of water that the solution of ammonium bicarbonate and ammonium sulphide thus produced will yield, on cooling and relief of pressure, the said ammonium salts in solid form.

4.—In the process conducted as referred to in Claim 3, the mother liquor is returned from the ammonium salts to the apparatus for absorbing a further quantity of ammonium compounds under pressure.

5.—In the process referred to in Claim 1, ammonia and carbon monoxide are separated from the highly compressed gases and subsequently treated with an absorbent, such as tar oils, for separating the benzene hydrocarbons.

6.—In the process referred to in Claims 1 and 5, the highly compressed gases, from which the ammonia, carbon monoxide, and benzene have been separated, are treated first with a dilute sulphuric acid and then with a strong sulphuric acid for the purpose of separating hydrocarbons of the acetylene and ethylene series.

7.—In the process referred to in Claim 1, the constituents referred to in Claims 2 to 6, are separated from the highly compressed gases, and then the residual gases are subjected in their compressed condition to low cooling for the purpose of separating other constituents in the well-known manner.

Controlling the Burners of Gas-Stoves.—No. 151,995.

No. 28,109; Oct. 4, 1920. Convention date, Oct. 2, 1919.

ERNST, E. U. G., of Denmark.

Efforts heretofore made for utilizing gas cooking-stoves to the greatest possible extent as regards economy have led, says the patentee, to rendering the amount of gas discharged, and thus the size of the gas flame, dependent upon the weight of the cooking vessel, in such a manner that heavy vessels will open the gas-discharge orifice more and light vessels less, whereas it will be totally closed when the vessel is removed. This has been the outcome of the consideration that heavy cooking vessels need a larger supply of heat than do light vessels, so that it is reasonable to regulate the gas discharge accordingly.

Experiments have, however, proved that the size of the bottom of the cooking vessel is the principal factor as regards the efficiency of gas-stoves, whereas the weight of such vessels is of less importance. The present invention is, therefore, characterized by the fact that the size of the gas flame is automatically regulated in accordance with the diameter of the bottom of the cooking vessel by a valve in the gas passage being (dependent upon the diameter of the cooking vessel) open more or less.

Distillation of Peat and Recovery of the Products. No. 173,662.

ROBUS, A. J., of Okehampton.

No. 31,470; Nov. 8, 1920.

This invention consists of improved apparatus for the distillation of peat and the recovery of the products; and its main object is to provide apparatus whereby peat containing as much as 90 p.ct. of moisture can be continuously distilled for the manufacture of charcoal, oils, tars, gases, and ammonia without previous drying, pressing, or other treatment. The original water content of the peat is vaporized in the apparatus and used to form a protecting envelope for the oils, resulting in an increased yield of oils, gas, and ammonia.

A number of tubular metal retorts, externally heated and arranged on a slightly inclined plane, are employed. In practice the patentee finds that the best results are obtained with retorts of from 8 to 10 in. dia. and 20 ft. long, contained in a rectangular metal casing lined with firebrick. The retorts are connected to a peat hopper and open at the other end into a gas-tight chamber.

The raw peat, without any previous treatment, is continuously fed through the retorts by means of spiral screws. The latter reach halfway along the interior of the retorts and do not come in contact with the hot zone, which is at the delivery end of the retort; but the pressure and speed of the screws are so regulated that an even and continuous discharge of the charcoal is secured in the chamber. The retorts are maintained at about 500° C. at the hot zone.

The oils and tars in the form of vapour, together with the gases, are collected from the retorts in the upper portion of the gas-tight chamber, and are conducted to suitable condensers. The charcoal is collected in the lower portion of the chamber, and is conducted to cooling chambers through valves, which are then closed. Water is sprayed into the cooling chambers; the surplus steam being withdrawn by pipes. The gases leaving the condenser are returned to the apparatus and burnt to maintain the temperature in the retorts.

Gas Cooking and Heating Stoves.—No. 173,846.

No. 28,151; Oct. 5, 1920.

BARKER, L. S., of Bristol.

According to this invention, the patentee describes and claims:

1.—The combination of a high-pressure boiler with its own independent gas burner or heater both contained in a closed box or boiler chamber together with, but usable apart from, the usual rings and burners of a gas cooking-stove, the top of such boiler chamber being made in the known way with openings and countersunk covers over the gas-rings; such boiler chamber having the necessary openings and apertures for ventilation and cleaning.

2.—The combination of a closed box or boiler chamber and its contained high-pressure boiler and independent burner or heater, as set out in the previous claim, with the usual hot and cold water circulating system for the supply of hot water throughout any building.

3.—The combination of a closed box or boiler chamber and its contents with an oven and a gas-fire, or with either of them.

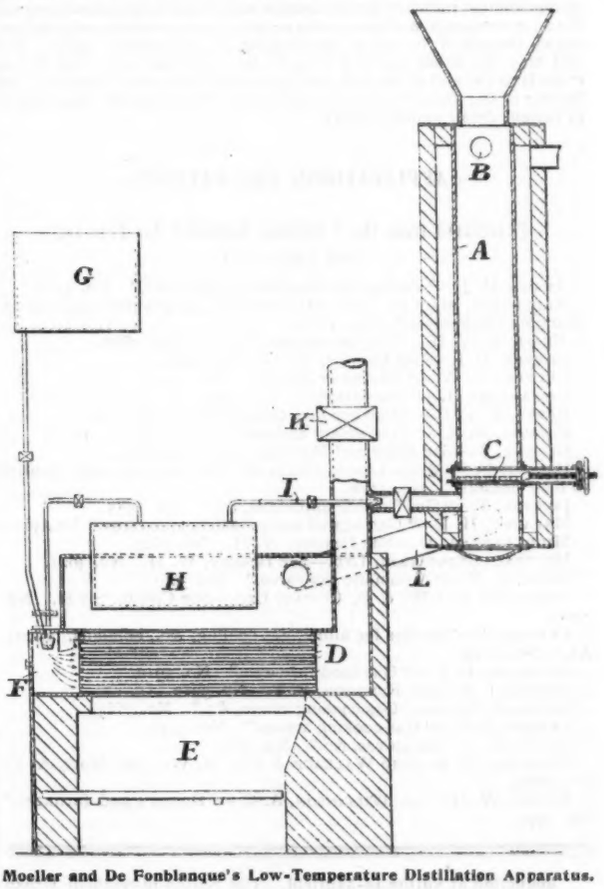
Manufacture of Illuminating Gas and Bye-Products. No. 174,165.

MOELLER, J., of Bridestowe, and DE FONBLANQUE, L., of Farnham.

No. 29,250; Oct. 16, 1920.

This invention relates to the low-temperature distillation of coal and other carbonaceous materials, and has for its object the production of illuminating gas of a high heating value, and coke, sulphate of ammonia, oils, and pitch as bye-products. Carbonaceous material is subjected in a retort to the action of a mixture of a gas rich in hydrogen (60 to 70 p.ct.) and of superheated steam or of such gas alone. Such gases may be generated from some of the oils separated from the coal or other carbonaceous material.

The superheated steam is used at a pressure slightly above that of the atmosphere and at a temperature of from 500° to 600° C. Some



Moeller and De Fonblanque's Low-Temperature Distillation Apparatus.

5000 to 9000 c.ft. of rich gases, a large amount of condensable hydrocarbons, a large quantity of sulphate of ammonia, and 65 to 70 p.ct. of coke are obtained per ton of coal. The usual gas coal yields by the treatment about 30 to 34 gallons of oils, which themselves yield in fractionation about 18 to 22 p.ct. of light oils, 60 p.ct. of medium and heavy oils, and 18 to 20 p.ct. of pitch of high value. These hydrocarbons are fractionated in a suitable still and the light oils are drawn off, then the medium and heavy oils, leaving the remainder as pitch. The

light oils are then further treated to make them suitable as motor spirit. The medium and heavier oils are utilized to make a gas rich in hydrogen by passing them, in addition to highly superheated steam, through small iron pipes, heated to from 800° to 1000° C., where the hydrocarbons are transformed into a fixed gas containing, according to the heat and steam used, between 60 and 75 p.ct. or more of hydrogen. This gas is utilized for acting upon the coal in the retort. As this gas leaves the iron pipes at 750° to 850° C., its temperature is reduced to about 500° to 600° C., and is mixed, before passing it into the retort containing the coal to be treated, with 20 to 25 p.ct. of superheated steam at 500° to 600° C. The coke produced is of a hard, sound quality and contains some 5 to 8 p.ct. of hydrocarbons, which render it suitable for household fuel—burning in an open grate with little or no smoky fumes and throwing out a great heat.

Apparatus suitable for carrying the invention into effect is shown in the accompanying sectional side view. A is the retort with a hopper at the upper end for charging it with coal, B being the outlet at the upper end for the distilled gases. On a valve near the bottom of the retort the coal rests. It is perforated to allow the passage of the mixture of gas and steam to the coal to act upon the latter; and it is arranged to be withdrawn from the retort in order to release the coke after the gasifying process ceases. There is a removable cover at the lower end of the retort. There is a casing surrounding the retort, and a space between the casing and the retort for the reception of the heating gases for preventing loss of heat during the gasifying process. The iron pipes D, heated by the furnace E, communicate by a pipe with the inlet to the retort, while the other end of the pipes opens into a vaporizing chamber F, into which medium or heavy oil is sprayed from a tank G by means of a pipe and nozzle. Steam from a boiler H is also heated by the furnace E. A pipe I supplies superheated steam to a nozzle in the inlet when the mixing of the steam and the gas generated in the pipes D takes place. A valve K permits the escape of the surplus gas not required for use in the retort. L is a pipe flue extending from the furnace to the casing round the retort for the passage of the waste heated products of combustion from the furnace into the casing.

Gas-Burners for Stoves.—No. 173,901.

AIRD, K., and WORTLEY, G. W., of Falkirk.

No. 29,209; Oct. 15, 1920.

This invention has for its object to construct an improved and cheaper injector, whereby the gas is sieved and given a steady velocity free from eddies, and the noise is reduced. It is of a type which consists in the employment of a rod or pin formed from pinion rodding or any similar rolled or drawn section with either longitudinal or spiral flutes, in conjunction with a casing or body having an internally tapered outlet, the end of the rod or pin working in the tapered outlet. The end may be either tapered or not; but in either case the fluting extends to the end of the rod, and the inside diameter of the rod at the bottom of the flutes or grooves is the same. The invention also consists in various detail improvements.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official Journal" for Feb. 15.]

Nos. 3364 to 4114.

ADAMS, H. J.—"Fitting for incandescent gas-light." No. 3364.
ALDER AND MACKAY, LTD.—"Coin-freed, prepayment, and price-changing mechanism." No. 4108.
BEASLEY, W. H.—"Carbonization of coal." No. 3621.
BOURKE, B. L.—See Beasley, W. H. No. 3621.
COLEBROOK, W.—"Gas water-heater." No. 3715.
COWAN, SIR H.—"Gas-meters." No. 3983.
FABRY, R. F. F.—"Bye-product coke-ovens." No. 3520.
FAIREST, E. R.—"Pipe socket and end." No. 3382.
GLOVER, T.—See Alder and Mackay, Ltd. No. 4108.
HILLER, F.—"Method for fastening inverted incandescent mantles to their holders." No. 3578.
JACKSON, T.—"Gas flashing apparatus, &c." No. 3955.
MALADRY, H. J.—"Gas-heated water-heating apparatus." No. 3618.
MIDDLETON, A. D.—See Beasley, W. H. No. 3621.
MINERALS SEPARATION, LTD.—See Beasley, W. H. No. 3621.
MORE, A. R.—"Automatic gas-valve." No. 3661.
PARKINSON AND W. & B. COWAN, LTD.—See Cowan, Sir H. No. 3983.
PETZEL, G.—"Bodies for filling, gas-cooling, &c., columns, towers, &c." No. 3623.
RENNISON, F. T.—"Gas-fired furnaces." No. 3910.
SHEARD, J. T.—See Rennison, F. T. No. 3910.
SNOOK, S. W. G.—"Gas-cooking stoves, &c." No. 3663.
TATHAM, J. E.—"Gas cooking-stoves." No. 3437.
WAITE, G.—"Gas-stoves, &c." No. 3834.
WALLACE, H. W., AND WALLACE & CO., H. W.—See More, A. R. No. 3661.
WEBER, W. H., AND WILKINSON, A. C.—"Burners and furnaces." No. 3979.

Reduction at Sutton-in-Ashfield.—The Sutton-in-Ashfield Urban District Council have decided to reduce the price of gas by 2d. per 1000 c.ft.

Mexborough Gas Prices.—At a meeting of the Mexborough Urban District Council last week, Mr. J. E. Cliff (a member of the Labour party) complained of the price of gas, and urged that 6s. 6d. per 1000 c.ft. was much too high. He favoured a policy under which the next generation should bear some part of the heavy capital obligations of the present period. It was decided to ask the Gas Board to reduce if possible the price of gas by 1s. per 1000 c.ft.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

Progress of Bills.

The following Bills have been read a second time: Bolton Corporation, Doncaster Corporation, Ramsgate Corporation, Stoke-on-Trent Corporation (Gas Consolidation), Stretford and District Gas Board.

Gas (Carbon Monoxide) Order, 1922.

The draft of the Special Order proposed to be made by the Board of Trade was approved by the House of Lords last week; so that the resolution has now passed both Houses.

HOUSE OF COMMONS.

Progress of Bills.

Bills read a second time and committed: Birmingham Corporation, Neath Corporation.

The Sheffield Gas Bill was read a second time, and referred to the Examiners.

Petitions against Private Bills.

Petitions have been deposited against the Bolton Corporation Bill, by the Turton Urban District Council, Messrs. Deakin and Deakins, Ltd., Earl of Ellesmere and Bridgwater Collieries, Ltd., and the London and North-Western Railway Company; Doncaster Corporation Bill, by the Great Central Railway Company, Great Northern Railway Company, and Messrs. W. T. Underwood, Ltd.; Stretford and District Gas Board, by the Altrincham Gas Company, Manchester Corporation, and the Manchester Ship Canal.

Kilmarnock Gas Provisional Order Bill.

A Bill to confirm a Provisional Order under the Burgh Police (Scotland) Act, 1892, relating to Kilmarnock Gas was presented by Mr. Munro, read the first time, and referred to the Examiners.

Public Utility Companies (Capital Issues) Act, 1920.

A copy was presented of a report by the Board of Trade under the Act on application by the Harrogate Gas Company.

Rating of Machinery.

A Bill extending only to England and Wales has been introduced to amend the law relating to the rating of hereditaments containing machinery. The clauses are as follows: (1) In the construction of any enactment relating to the gross estimated rental, gross value, annual value, net annual value, rateable value, or assessable value of any hereditament for the purpose of any local rate, or of the basis or standard thereof, or of any valuation list, or of any water-rate or water-rent, the word "hereditament" shall be deemed to include such machinery only as is fixed or attached to the hereditament. (2) In the case of any hereditament occupied for any trade, business, or manufacture, the expression "fixed or attached" in the preceding section shall be construed as applying to all machinery, machines, or plant in or on the hereditament for producing or transmitting first motive power or for heating or lighting such hereditament, but save as herein provided shall not apply to machines, tools, or appliances which are only so fixed that they can be removed from their place without necessitating the removal of any part of the hereditament.

Imported Gas-Mantles and Taxation.

Mr. KILEY asked the President of the Board of Trade if he could explain why the decision of the Referee under Part I. of the Safeguarding of Industries Act, imposing a duty of 33⅓ p.ct. on certain parts of gas-mantles, had not been put into operation.

Mr. BALDWIN replied that the Referee had been asked by the complainants, the manufacturers of gas-mantles, to state a case for the consideration of the High Court. The Referee had acceded to this request; and in the meantime the award had not been signed. Consequently there was no decision which could be put into operation.

Mr. KILEY asked Mr. Baldwin if he could give any idea as to when a conclusion would be reached.

Mr. BALDWIN replied that he was afraid he could not.

Gas on the Therm Basis.

The new method of supplying gas on the therm basis and how consumers' interests are protected are popularly explained by "A. M. A." in an article appearing in the Hastings and St. Leonards press. He remarks that, in the case of the Hastings Gas Company, the declared calorific value is 460 B.Th.U., a figure which may be said to be a fair average of the various values already decided on by many of the leading undertakings. Let us see, the writer goes on, how the local undertaking has fulfilled its duties during the last two years, probably two of the most trying years in the history of gas manufacture. As a simple matter of fact, the average calorific value of the gas supplied for 1920 was 466 B.Th.U., and for 1921 the figure was 461 B.Th.U. The drop of a few points for 1921 is entirely accounted for by the trying times of the prolonged coal strike, when coal supplies for a lengthened period were extremely difficult to obtain, and often of very inferior quality for the purpose required. But in spite of all the difficulties of the last two years, the local Gas Company have not only maintained the supply, but they have also "delivered the goods" in regard to quality. To get the best out of gas, whether used as illuminant or for fuel purposes, modern methods give the best and most economical results. To continue to use appliances that served a useful purpose generations ago, and to expect the same results as the most modern and up-to-date appliances give, is not only unreasonable, but it is bad economy.

MISCELLANEOUS NEWS.

ILFORD GAS-WORKS TRANSFER.

Terms in the Gas Light and Coke Company's Special Order.

In the draft of the Special Order under section 10 of the Gas Regulation Act, for which, as already intimated in the "JOURNAL," the Gas Light and Coke Company have made application to the Board of Trade, the terms are set forth of the agreements under which the undertaking of the Ilford Gas Company is to be acquired by the Gas Light and Coke Company, as from July 1 next.

For every £100 of "A" and "C" 5 p.ct. ordinary stock of the Ilford Company, there is to be issued £155 of ordinary stock of the Gas Light and Coke Company. For every £100 of "B" 3½ p.ct. ordinary stock of the Ilford Company, £123 of ordinary stock of the Gas Light and Coke Company. For every £100 of 4 p.ct. debenture stock of the Ilford Company, £133 6s. 8d. of 3 p.ct. consolidated debenture stock of the Gas Light and Coke Company. For every £100 of 7½ p.ct. redeemable debenture stock of the Ilford Company, £100 of 7½ p.ct. redeemable debenture stock of the Gas Light and Coke Company.

The Directors of the Ilford Company are to receive as compensation for loss of office a sum of money equivalent to seven years' purchase of the annual amount of their remuneration. The Auditors are to be paid a sum equal to three years' remuneration.

Such officers as are not taken over by the Gas Light and Coke Company will receive as compensation for loss of office such an amount as may be agreed between the Gas Light and Coke Company and such officer, or as, failing such agreement, may be determined by an arbitrator to be agreed upon, or in default of agreement appointed by the President of the Institute of Chartered Accountants. Subject as aforesaid, the provisions of the Arbitration Act, 1889, shall apply to such determination. The Gas Light and Coke Company will continue to pay all pensions granted by the Ilford Company; but they may by agreement commute such pensions by payment of a sum in gross.

GAS REGULATION ACT APPLICATIONS.

The following further notices have appeared in the "London Gazette" of applications to the Board of Trade under the Gas Regulation Act.

Arundel Gas Company.

The standard price now authorized in respect of the supply of gas by the undertakers is 4s. per 1000 c.ft.; and the price they have asked the Board of Trade to substitute for this is 1s. 8½d. per therm.

Elstree and Boreham Wood Gas Company, Ltd.

The standard price now authorized in respect of the supply of gas by the undertakers is 4s. 7d. per 1000 c.ft.; and the price they have asked the Board of Trade to substitute for this is 1s. 5·2d. per therm.

SPECIAL ORDERS.

Rhymney and Aber Valleys Gas and Water Company.

The Company have applied to the Board of Trade for a Special Order under section 10 to change the name of the Company to the Rhymney and Aber Gas Company, &c.

St. Annes-on-the-Sea Urban District Council.

Notice is given of an intended application by the Council to the Board of Trade for a Special Order to enable them to acquire the undertaking of the St. Annes-on-the-Sea Gas Company; to supply gas on a thermal value basis; to borrow money; and to regulate the supply of gas. The maximum price now authorized in respect of the supply of gas by the Company is 5s. per 1000 c.ft.; and the maximum price which the Council propose should be prescribed in respect of the supply of gas by the Council after the cesser of the temporary operation of any Order made by the Board of Trade on the application of the Company is 19d. per therm, with additional charges in respect of the supply of gas through prepayment meters, and for the hire of prepayment meters and fittings.

DECLARATIONS OF CALORIFIC POWER.

Brentford Gas Company.—450 B.Th.U. (March 29.)
Leyland Gas Company.—470 B.Th.U. (April 1.)
Newmarket Gas Company.—550 B.Th.U. (Feb. 20.)

GAS REGULATION ACT ORDERS.

We have received from the Director of Gas Administration copies of the following further Orders made by the Board of Trade under section 1 of the Gas Regulation Act.

Ascot District Gas and Electricity Company.

As from the declared date, the maximum price in respect of gas supplied by the undertakers shall be 18·6d. per therm. (Feb. 10.)

British Gas Light Company, Ltd. (Trowbridge).

As from the declared date, the maximum price in respect of gas supplied by the undertakers shall be 16·6d. per therm, and so in proportion for any less quantity supplied, provided that every fraction of one-half of a therm shall be charged as one-half of a therm. (Feb. 14.)

Chippenham Gas Company.

After the declared date, the standard prices in respect of gas supplied by the undertakers shall be 15d. and 16·2d. per therm; and these prices respectively shall be substituted for those of 4s. and 4s. 6d. per 1000 c.ft. mentioned in section 56 (dividend dependent on price charged) of the Chippenham Gas Act, 1904.

For the purpose of ascertaining the authorized rate of such dividend, any price charged per 1000 c.ft. before the declared date shall be rendered into the equivalent price per therm by dividing it by four and-two-fifths.

Prepayment meter clauses are included. (Feb. 11.)

Kenilworth Gas Company.

As from the declared date: (1) The maximum price in respect of gas supplied by the undertakers shall be 16·4d. per therm; (2) "2d." shall be substituted for "1s." and the word "therm" shall be substituted for "1000 c.ft. of gas" in section 58 (limiting price of gas) of the Kenilworth Gas Act, 1917.

As from the declared date, the words "0·1d. per therm" shall be substituted for "¼d. per 1000 c.ft." in section 89 (power to establish a benefit fund) of the Kenilworth Gas Act, 1917.

Prepayment meter clauses are included. (Feb. 15.)

Newmarket Gas Company.

After the declared date, the standard price in respect of gas supplied by the undertakers shall be 17d. per therm.

For the purpose of ascertaining the authorized rate of such dividend, any price charged per 1000 c.ft. before the declared date shall be rendered into the equivalent price per therm by dividing it by five-and-one-half. (Feb. 14.)

Southbank and Normanby Gas Light and Coke Company, Ltd.

After the declared date: (1) The price of 17·4d. per therm shall be substituted for the price of 5s. per 1000 c.ft. mentioned in section 20 (fixing maximum price of gas with sliding-scale as to dividend) of the Southbank and Normanby Gas Order, 1877; (2) the word "therm" shall be substituted for the words "1000 c.ft." where these secondly and thirdly occur in section 20 of the Southbank and Normanby Gas Order, 1877, and the words "0·2d. for every 3·4d." shall be substituted for the words "1d. for every 1s." in the same section.

For the purpose of ascertaining the authorized rate of such dividend, any price charged per 1000 c.ft. before the declared date shall be rendered into the equivalent price per therm by dividing it by four-and-one-half. (Feb. 13.)

DERBY GAS LIGHT COMPANY.

At the annual meeting of the Company last Friday, Mr. WILLIAM WOOLLEY (the Deputy-Chairman) presided, in the absence, through indisposition, of the Chairman, Alderman J. W. Newbold.

In proposing the adoption of the report and accounts, Mr. Woolley gave details of the balance-sheet. The year 1921, he said, had been one of the most difficult and anxious in the annals of the Company. The cost of manufacture was £310,162, of which no less than £216,876 was for gas coal, oil, and fuel. This heavy expenditure included the three months' coal stoppage, when they were compelled to purchase a large amount of imported coal at nearly £5 per ton, and, in addition, 400,000 gallons of oil. This disastrous coal stoppage, which ruined so many, benefited nobody. The cost to the Company was somewhat difficult to calculate; but £20,000 was a conservative estimate. They would not be surprised to find that there was a reduction of just over 11½ p.ct. in the gas sold, due to the acute trade depression. The reduction in working costs on the year of £24,699 was more than wiped out by over £45,000 in reduced value of residuals. The total revenue for the year amounted to £401,992, which left a gross profit of £20,657, as compared with £39,025 for the previous year. Taking into consideration the difficulties and many obstacles with which they had had to contend, the results were quite as good as could have been expected.

The report and accounts were adopted; and the standard rate of dividend of 3 p.ct. for the half year ended Dec. 31 last (less income-tax) was declared. A hearty vote of thanks to the Directors, officials, and staff was acknowledged by Mr. J. Ferguson Bell (Engineer and General Manager), who mentioned that the number of consumers had increased by 657, bringing the total to nearly 37,000.

Results at Portmadoc.—The report of the Gas Committee to the Portmadoc Council showed that although £500 was lost through the coal strike, a gross profit of £1148 was made during the year. It was decided to reduce the price of gas by 5s. per 1000 c.ft.

Gas in Perth (Western Australia).—The 1921 report, just to hand, of the Municipality of Perth (Western Australia) states that the gas manufactured for the year totalled 142,322,000 c.ft., as compared with 134,746,000 c.ft. last year, being a 5·62 p.ct. increase. The greatest daily output was 507,000 c.ft. During the year the following fuel was used: Newcastle coal, 8518 tons; Collie coal, 828 tons; coke, 59 tons; oil, 7739 gallons. The price of Newcastle coal averaged 57s. 6d. per ton, against 47s. 11d. last year. The number of meters connected was 4593, as against 4580. The number of cookers and grillers on hire by the department is 2454—a decrease of 223. The number owned by consumers has proportionately increased. Gas street-lamps now numbered 640, against 1113 last year. The mains laid during the year totalled 4240 yards (high-pressure main and feeders), and 160 yards were taken up and replaced by larger main. Total length of mains is now 82·37 miles. During the year contracts were let and work is well under way for the new works at East Perth, as follows: (1) Reinforced concrete coal-store and foundations (nearly completed). (2) Steel structure for overhead railway (ready to erect). (3) Retort-house and retorts (Woodall-Duckham and auxiliaries). The work on contract (1) had been considerably delayed from various causes, and had made slow progress. It was hoped, however, that the whole up-to-date plant would be working in twelve months. No increase in price of gas had been made during the twelve months; and although the gas plant again showed a loss, the new plant would remedy this.

SOUTH SUBURBAN GAS COMPANY.

The Annual Ordinary Meeting was held last Friday, at the Cannon Street Hotel, E.C.—Mr. CHARLES HUNT, M.Inst.C.E., in the chair.

The SECRETARY (Mr. Wilfrid Wastell) read the notice convening the meeting; and the Directors' report and the statement of accounts were taken as read.

AN EVENTFUL YEAR.

The CHAIRMAN, in moving the adoption of the report and accounts, said: It has been usual to take the report and accounts as read; and I presume you will do so on this occasion. [Agreed.] If I remember rightly, I ventured to refer last year to the period we were then considering as having been a particularly eventful one as regards the gas industry. Similarly, this applies to the year 1921; but with much greater emphasis, because that year has to its credit two such epoch-making events as (1) the putting into operation of the Gas Regulation Act and the establishment of the therm as the basis of charge for gas supply; and (2) a coal stoppage entirely without precedent as to its duration, and its disastrous consequences not only to the mining industry itself, but also to all other industries in this country more or less dependent upon it.

THE COMPANY ON THE THERM BASIS.

With regard to the Gas Regulation Act, you have already been informed that application to the Board of Trade was made in due course for an Order placing the Company under it, and for a new standard price for gas corresponding with the altered conditions as to cost of gas production and distribution resulting from the war. This application was duly considered; and the Board of Trade issued an Order on April 21 last, giving the Company a new standard price of 15d. per therm in lieu of the old one of 2s. 9d. per 1000 c.ft., which had existed since 1916. This is a better one by 2d. per therm. or something like 10d. per 1000 c.ft., than the standard price in our Bill of 1920 as it had left the Lords Committee, and amply justifies the decision which we then arrived at to withdraw the financial clauses of that Bill. To us, moreover, it seemed abundantly clear, from the latest of our very carefully prepared figures submitted to the Board of Trade, that a higher standard price even than 15d. per therm was necessary for the immediate resumption of our pre-war dividends. Consequently, the decision of the Board of Trade to give only 15d. was a little disappointing, though, as matters have turned out, we are not without hope of being in a position to improve the dividend before very long.

CARBON MONOXIDE.

Under the Gas Regulation Act instructions were given to the Board of Trade to inquire into and determine whether it is necessary or desirable to prescribe any limit on the proportion either of inert or incombustible gases or of carbon monoxide which may be supplied in gas used for domestic purposes. Accordingly, two separate Committees were appointed by the Board of Trade for these purposes, and in each case the inquiry was, I need not say, both impartial and exhaustive. In each case, also, the same conclusion was arrived at—namely, that no limitation is desirable, although with a reservation by the Inerts Committee that a further inquiry should be made at the end of three years, by which time gas undertakings may be expected to have settled-down to their new conditions under the Act. To this proposition no reasonable objection could be urged, and the Committee's decision has been generally accepted. As regards, however, the presence of carbon monoxide, the finding of the Committee has recently been challenged—notably by Prof. W. A. Bone and Dr. J. S. Haldane, supported by articles in the "Times" newspaper. As the subject is of considerable importance to this Company as manufacturing water gas for economical reasons, I may perhaps be permitted to say a word or two on the points involved. Carbon monoxide is, as you are aware, an inodorous combustible gas, produced from gas coke by the decomposition of steam. As carburetted water gas—*i.e.*, enriched with oil gas—it was introduced into this country from the United States towards the end of last century, and rapidly came into general use. We, however, did not employ it to any extent until after 1914, when, owing to the war, it became impossible to procure additional coal-carbonizing plant. Water gas then became indispensable; and we and others learned to use it without enrichment, except that which it derived when mixed with the coal gas in its passage through the retort-house mains. This resulted in an appreciable saving of coal, though it is not to be supposed that any gas company got the benefit of the saving, because, as you know, we were kept down to three-fourths of our standard dividend all the time. As, however, the time drew near when relief to the long-suffering public utility companies became urgent, the Government instructed the Fuel Research Board, under the chairmanship of Sir George Beilby, to consider and report to the Board of Trade on the general subject of gas supply.

NO GROUND FOR RESTRICTION.

As you know, the Fuel Research Board in its recommendations discarded the already almost obsolete candle-power test, and placed the value of our gas upon a permanent heat basis. But it did much more, for it put upon gas undertakings the duty of declaring the calorific power of the gas they proposed to supply; and thus not only gave them freedom to manage their businesses in their own way, but also indicated (not at all uncertainly) the means by which this could best be done in the interests both of themselves and of their customers. So it happened that gas makers, who under the old *régime* had often to lament the wasting-away of their coke stocks in times of depression of trade, now rejoiced in the additional alternative of a permanent market for their surplus coke by its conversion into straight water gas, and its supply (mixed with coal gas) to consumers through the usual distributing plant. The manifest advantage of this to everybody concerned could not possibly be ignored; but it is not to be supposed that while readily responsive to this clear call to fuel economy, gas men were at all prepared to ignore what they owe to the consumers in the matter of general convenience and avoidance of risk in the application of their gas supply. Our difficulty has always been, and continues to be, to find any real ground for restrictions which have been more or less insistently urged in some quarters against gas on account of its containing a larger proportion of carbon monoxide. Everyone knows, of course, that this is a poisonous gas—more poisonous in fact than pure (so-called) coal gas; but it is not meant to be inhaled. Its function is to produce, when burnt, light and heat; and no harm can result from its being so used. We are at all times prepared to fall in with any suggestions that may be proved needful to safeguard the public, but no such proof has yet been forthcoming, though the system was introduced into this country more than a quarter-of-a-century ago, since when its growth has been almost phenomenal. Starting with a yearly production of less than 8000 million cubic feet, last year this production exceeded 40,000 millions, or equal to about one-sixth of the entire gas supply of the United Kingdom. In the year 1898 the Government ordered an inquiry to determine whether this manufacture should be allowed, and if so, on what conditions. The Committee of Inquiry decided to recommend a limitation of 12 p.ct., but nothing was done to give effect to this, and the matter still remains where it was then left. Dr. Haldane, who was a member of the Water Gas Committee in 1898, is now disposed to recommend an extension of the limit of 12 p.ct. to one of 20 p.ct., on the ground of the improvements which have in the interval been made in the construction of gas-burners (both incandescent and flat-flame); and it is not easy to see what virtue there can be either in a 12 p.ct. or a 20 p.ct., or indeed any other limitation. It is evident, in fact, that you can hardly expect to secure immunity from defective fittings by limiting the proportion of carbon monoxide in the incoming gas, and from this it would appear that the real remedy for what is now complained of is the insistence on a more careful and systematic inspection of all house fittings. Meantime, it will do good to bear in mind that in the United States (the birthplace of the water gas system), the use of water gas is practically universal, nor are there any regulations which limit the percentage. Moreover, Sir William Pearce, M.P., who was the Chairman of the Departmental Committee entrusted with the inquiry to which reference has already been made, states that from the correspondence it is clear that straight water gas is in general use in America as being "in the public service."

THE COAL STOPPAGE.

A complete stoppage of the coal mining industry (lasting, in fact, for three full months on end) was, until it actually occurred last year, an unbelievable proposition. It, however, found the Company fairly well prepared; and I am very glad to be able to say that, greatly to the credit of every official and every employee concerned, from the highest to the lowest, our gas supply was fully maintained throughout, both as to quantity and quality. As in duty bound, however, the injunctions of the Board of Trade as to the necessity for observing the strictest economy in the consumption of gas were conveyed to our consumers; and there is reason to believe they were not without effect. Certainly a loss of consumption was experienced during the stoppage, added to which foreign coal had to be procured, particularly to supply the outlying stations where coal storage is limited. From almost the commencement of the stoppage, therefore, experience with the various kinds of coal available—good, bad, and indifferent—began to accumulate, and the knowledge thus acquired is stored-up for future reference if, unfortunately, it should have to be called upon. In the meantime, it is a relief to know that there is throughout the world a plentiful supply of really useful coal for gas-making purposes, the availability of which henceforth is not likely to be overlooked.

EFFECTS OF THE STOPPAGE.

At this distance of time it can hardly be necessary to say much with regard to this stoppage apart from its effects upon the operations of the Company. But it ought to be emphasized, as having been placed on record beyond any doubt by the most responsible of the miners' leaders, that this most serious of all industrial wars was at the same time the most wanton, inasmuch as it was waged for an impossible ideal, which, if successful, could not but have resulted in the ruin of industrial England. And it is no exaggeration to say that the one redeeming feature of the disastrous business was the ultimate acceptance by the miners of a profit-sharing scheme, which may in course of time develop into co-partnership as we understand it. It is at all events an important step in the right direction, and its operation will be followed with much interest. There is a saying, that it is the first step that costs; and the first step that costs having now been taken to bridge over the great cleavage that has unfortunately developed so widely between capital and labour, the rest should not be difficult. Capital and Labour are really inseparable, the one being necessary to the other, and any attempt to divorce them means ruin to both. When Sir George Livesey founded our co-partnership, he was very keen on giving wage-earners the same opportunity to invest their savings as had been given to the middle classes by the introduction of limited liability not many years previously. As a result of that alteration of the law there followed a very marked increase of industrial enterprise, with corresponding increase of employment. Sir George hoped for a similar result as regards the gas industry from his introduction of co-partnership, and, notwithstanding the interruption caused by the war, there is already something like £60,000 of the Company's stock held by co-partners, with a very fair prospect of its being augmented during the next few years. So that this system actually creates the capitalist out of the wage-earner. Not only is there nothing inconsistent in this, but it makes in more ways than one for the wage-earner's well-being. For one thing, he helps to keep the gas industry going, while at the same time he is making some provision for his own future. And I venture to say that the more there are of such capitalists, the better will it be for the whole community.

COMMENTS ON THE ACCOUNTS.

The accounts show the position as regards dividend. This may almost be considered unique, since the proposed division leaves the cupboard bare. But when it is recollected how unprecedented last year was in regard to the various burdens that had to be borne—almost the heaviest of them unforeseen—it cannot but be a matter of satisfaction

that the finances of the undertaking have stood the strain so well. Let me remind you that the new Act did not come into operation as regards this Company until one of the two best quarters for gas consumption had passed. The benefit, therefore, it was hoped would be derived from an increase of charge commencing with the operation of the Act was confined to the remaining portion of the year; whereas the increased dividend and co-partnership bonus became—so to speak—liabilities for the whole year. In the next place the benefit that might have been derived from a higher price to commence with was less than it certainly would have been had our pre-war dividend been kept in view in fixing the new standard price. I do not say that technically this was a point that could have been insisted upon; and though we tried very hard to move the Board of Trade in this direction, our efforts were without effect. Fortunately, however, since then manufacturing costs have been tending downwards, and we now find ourselves in a better position than was at that time feared with regard to future dividends. But we continue to be greatly puzzled to account for the apparent difference between our treatment and that of others in this respect. There has also to be considered the fact of a falling-off in the consumption of gas, and the extra expenditure involved in providing for the new business which did not accrue. In addition to all these matters, there is the heavy expenditure resulting from the coal stoppage; and we are rather proud—and I hope not without justification—of the fact that the whole of our abnormal expenditure under this head has been cleared-off in the accounts before you. As to how much this coal stoppage might have cost the Company, some idea may have been gathered from the statements made at various times relating to other companies somewhat similarly situated; but I am glad to be able to say at once that the cost to this Company was covered by about £22,000. We had a very good stock of coal to begin with, and bought only from-hand-to-mouth as long as the stoppage lasted. I venture to think you will agree we came out of it fairly well at the figure I have named, and without having to increase the price of gas to meet the emergency. We have lost, indeed, the whole of the carry-forward from the previous year, and have taken some £1400 or so from the reserve fund. But let me say we feel more than fully compensated for this by the abolition of coal control, the history of which, if and when it comes to be written, will be interesting reading. For the present, at any rate, we are glad to be clear of the whole subject, except that it reminds us we have been greatly helped by recent reductions in the price of coal, which enable us to face the future with a greater feeling of security than would otherwise have been possible, having regard to the substantial reduction recently made in the price of gas. The cost, also, of wages and materials is tending downwards: and it is only due to gas workers to say that they have quite realized the position, and have shown every disposition to accommodate themselves to it. We have had to disappoint our own co-partners with regard to the additional bonus it was expected that with a new standard price it would have been possible to pay. But the coat has had to be cut according to the available cloth, and fortunately there is enough of this to go round conformably with pre-war measurements. It is arranged that each co-partner shall receive a bonus for the full year equal in amount to that which he would have received before the war in similar circumstances, and this bonus will be distributed as soon as circumstances will admit of its being done. I have now much pleasure in proposing the adoption of the report and accounts; and when this proposal is seconded (as I hope it will be by the Deputy-Chairman), I shall be glad to hear any remarks thereon, or to reply to any questions relating to them that may occur to stockholders.

The DEPUTY CHAIRMAN (Sir J. Fortescue Flannery, Bart., M.P.) seconded the motion.

Prof. H. E. ARMSTRONG said that in the previous week there was a good deal of useful discussion on carbon monoxide; but it was clear from that day's Press that the subject had not been set aside. A veiled suggestion was made that Dr. Carpenter was guilty of levity the preceding week in suggesting that people in the streets were liable to inhale carbon monoxide when behind motor cars, and also in referring to its production by ordinary tobacco smoke. The proposal was made that there should be an inquiry into the whole matter. The country was fairly sick of inquiries; and they knew that, as a rule, these inquiries were useless. If they wanted an illustration of this, they had only to look at the inquiries under the Safeguarding of Industries Act during the last few months. Gas companies had to take this matter of carbon monoxide very seriously. He thought the Chairman had put the case better that day than it was put the previous week. Elsewhere the statement was made that there was nothing in the composition of the gas now being supplied that need give the slightest cause for alarm. There was a great deal; and the public were quite right in fearing carbon monoxide. They were living in an age of sentiment: and the public did not realize that the fault lay with themselves. There was a lack of intelligence in respect of carbon monoxide from which they were suffering; and this scare would do a great deal of good. That morning he happened to see a man going about adjusting gas-fittings; and he told him that everybody was now smelling gas everywhere. [Laughter.] This led him to suggest that it would be a good thing if gas companies cut-off the bye-pass burner. This frequently became burnt-out; and from it they got escapes. The bye-passes were not of real service in a house. However, the public had to realize that the danger was nothing compared with that which they underwent daily in going about London. They rarely crossed the street now without more or less risk. It was quite astonishing, too, how much carbon monoxide was thrown into a room by a number of smokers; and it was somewhat surprising to what an extent the smoke became inhaled, and how the smoker was affected by it. A physiologist told him lately that his blood always showed carbon monoxide; and the blood of the majority of cigarette smokers would be found in that condition. The public should realize that it was systematically subject to carbon monoxide. If they started a motor car in a garage, they got an atmosphere of carbon monoxide. The same thing occurred in a stokehole. They had to realize that it was not only the gas companies who were sinners in the matter; but at the same time they should try to get rid of the sentiment in connection with it. Gas companies had to look forward. They had introduced the therm, and had now a rational basis of charge. But they had not standardized the therm. They could put into it any muck, so long as it would burn. They were not making a gas which would give proper results in a burner. They were doing with gas what they were complaining of the coalowners doing. They complained that the colliery people supplied them not with coal, but with shale, and yet they put inerts into their gas. Until they looked at it from the moral point of view of the South Metropolitan Company, and standardized the gas as well as sold it by the therm, they would not be in a safe position before the public. Prof. Bone had really used carbon monoxide as a bit of bye-play to get home the case of high calorific value. That was what he was looking for. It was from this point of view that he (Prof. Armstrong) had for a good many years past been urging gas companies to look at this low-temperature carbonization question. It was the only way open to them in the future to get gas of proper quality at a reasonable price. The economic results gas companies got at the present time were dependent not only upon the price of gas, but upon the price of the bye-products. At the moment, they could sell their coke. But at no distant date coal would be cheaper; and they would have low-temperature coke put on the market which would be preferred by the public. Gas coke would then not sell. The speaker said more on this subject, during which

Mr. SAMUEL SPENCER interposed, and asked whether the subject now being dealt with was before the meeting. He said he had been interested in the gas industry now for sixty years; and the men who had charge of the industry's affairs knew quite well what was required in the way of gas. In regard to carbon monoxide, water gas was universally used in America. At Plymouth one week last year nothing but water gas could be supplied; and there was not a single complaint from the consumers. The remarks that were being made by Prof. Armstrong as to low-temperature carbonization for gas supply were, in his opinion, absolute nonsense.

Mr. CHARLES WEBB said the remarks of the first speaker were of the kind that might be an inducement to depress the values of gas stocks; but he could assure him that he would not succeed in that. So long as they had men such as those sitting at their Board table directing the affairs of the gas industry, there need be no fear of being poisoned if ordinary care were taken. As to gas stocks, such remarks as they had heard would not depress them, as there were plenty of buyers who wanted something good. Was there any idea of issuing more capital?

The CHAIRMAN said there was no present intention of doing so; and as to the depreciation of gas stocks, he did not think there need now be any fear of that.

The motion was unanimously carried.

THE DIVIDEND.

The CHAIRMAN moved the declaration of a dividend for the past half year at the rate of 5½ p.ct. per annum, less income-tax.

Mr. E. P. NORTON seconded the motion, which was unanimously carried.

RETIRING DIRECTORS.

The DEPUTY-CHAIRMAN moved the re-election to their seats at the Board of the Chairman and Dr. Charles Carpenter. It was a very pleasant duty to have to move the re-election of both these gentlemen. In Mr. Hunt they had a worthy successor to their late friend, Sir George Livesey. From their Chairman they had had a clear, lucid, and convincing exposition of that somewhat abstruse and important subject—carbon monoxide; and Dr. Carpenter's contributions to the same subject were familiar to them. Speaking for himself, he ventured to say that if the Company combined public safety with economy in the use of coal, they were performing a great public good. It was as much the duty of the gas industry to exercise economy as it was the duty of the Government to do so, although, so far as he knew, Sir Eric Geddes had not yet turned his attention to the gas industry. They would hope to be economical without that stimulus. When they found that one-sixth of the total gas consumption of the United Kingdom was water gas, which they all knew was largely carbon monoxide, they realized they could not withdraw from this great economical system of manufacture simply because of alarmist suggestions of danger. There were two safeguards which the public had. The first was careful attention to fittings and connections, so that there should be no leakage. Such attention was given by the workmen of the gas companies and by the gas-fitting firms; and the proportion of escape was so small that it might be said to be negligible. The second safeguard was that, if there be (as there was in most cases) a sufficient admixture of carburetted hydrogen, which had a pungent odour, an escape would be easily detected. Prof. Armstrong said that people were going about stating that everybody was smelling gas—he supposed by imagination. With these two safeguards, he ventured to say there was no need for public alarm, that the public danger would be worse was very unlikely, and that danger could be and would be eliminated to the uttermost in the near future. The co-partnership system still stood well to the front; it still stood in the highest place in the faith and belief of every member of the Board, and he believed of every proprietor and every employee co-partner as well.

Mr. JOHN H. BORASTON, C.B., O.B.E., seconded the motion, which was heartily passed.

Both the CHAIRMAN and Dr. CARPENTER sincerely acknowledged the confidence in them thus expressed by the proprietors.

THE AUDITORS.

On the motion of Mr. A. J. KINGDON, seconded by Mr. SPENCER, the retiring Auditor (Mr. Alfred Morland, F.C.A.) was re-appointed.

VOTES OF THANKS.

Moved by Mr. SPENCER, and seconded by Mr. WEBB, a cordial vote of thanks was passed to the Chairman and the Directors.

The CHAIRMAN, in reply, said his colleagues and himself were very grateful to the proprietors for their expression of approval. He could assure them they would do their best in the future as they had in the past. He had next to perform the pleasant duty of asking the proprietors to pass a hearty vote of thanks to the officers, staff, and workmen for their attention to the affairs of the Company during the past

year. It had been a very trying year to everybody from the Directors and the chief officers downwards. He was quite sure every one had done his best; and he was perfectly convinced the proprietors would feel the vote of thanks was thoroughly deserved.

Mr. WEBB seconded the motion, which was heartily carried.

Mr. JOHN TERRACE, Chief Engineer, on behalf of the engineering staff and the workmen generally, said he wished to thank the proprietors very much indeed for their kind vote of thanks. The Chairman had remarked that it had been an anxious year for all of them. They had tried to do their very best; and they hoped they had succeeded somewhat. Most of their troubles—in fact, all of the troubles they had had during the year had come from outside. They were all things over which they had had no control. But he was pleased to say the loyalty of every one of the staff right through the workpeople was most marked. One felt there was that harmony and desire on the part of everyone to keep things working smoothly which could not but have the best effect for the good of the Company.

Mr. WASTELL said, on behalf of the clerical staff, he wished to thank the proprietors most sincerely for their kind expression of appreciation of their services.

BOURNEMOUTH GAS AND WATER COMPANY.

The Ordinary General Meeting of the Company was held last Friday, at the London Offices, No. 90, Cannon Street, E.C.—Mr. WILLIAM CASH, F.C.A. (the Chairman), presiding.

The SECRETARY (Mr. H. A. Plumb, F.C.A.) read the notice convening the meeting, and the minutes of the previous meeting; and the Directors' report and statement of accounts were taken as read.

A YEAR OF VERY HARD WORK.

The CHAIRMAN, in moving the adoption of the report and accounts, said that, in summing-up the position as regarded the year 1921—because they were dealing with the accounts of the whole twelve months—he thought it would be a correct statement to make that the year had been one of very hard work for the Directors and for the officers of the Company. They had had a number of difficulties to overcome; but he was happy to tell the shareholders that they had been gradually surmounted. He thought he might say that the Company were now emerging from their more serious troubles into smoother water. During 1921, of course, the general state of trade in the country had been gradually declining; so that at the present time, what with one thing and another, they were not in a prosperous condition as a nation. Also they were suffering from the effects of high taxation. No doubt, these adverse factors were reflected in Bournemouth—particularly as regarded people living on limited incomes, and as it was a town used very largely as a pleasure resort. A year ago he had told the shareholders that he could see the peak in regard to questions of cost; and though after the meeting there were some advances both in respect to wages and materials, the position now was different, and prices were declining. The cost of coal was down; and wages had been decreased. In fact, in the latter half of 1921 and the beginning of this year there had been three reductions in wages, which came to the not unsubstantial amount of 15s. 9d. per man per week. They had also been able to effect some reduction in salaries of their officers, in respect of bonuses added during the war period. The result of all this was apparent in the intimation contained in the report, that as from Jan. 1 last they had been able to reduce the price of gas by another 3d. per 1000 c.ft.

PROVISIONAL WATER ORDER.

The report dealt with what had been an important matter to them during the past year—and that was the general statutory position of the Company. Twelve months ago he indicated the course of action which the Board had in mind; and this had been brought to a conclusion during the period under review. In the first place, they had presented a Water Order to the Ministry of Health; and this was finally approved by Parliament. The effect of it was to add 33⅓ p.ct. to their authorized scale of charges; but he might remind the shareholders that the Company's water charges now, compared with those of other undertakings, were extremely low. They made no charge for extras; and their over-all charge was only 6⅝ p.ct. on the net rateable value. He repeated what he had said on the last occasion—that this was a very reasonable thing to ask for, in view of the facts that they had made no increase throughout the whole of the war period from 1914 to 1921, and that wages for 1921 were three times what they were in 1914.

GAS REGULATION ACT ORDER.

Then, with regard to gas, they took advantage of the provisions of the Gas Regulation Act, 1920, and applied to the Board of Trade for a revised standard upon which the dividend on the original capital was based. An Order was received with which they were not dissatisfied, and which in one respect, he believed, was unique. The Board of Trade, of course, were inundated with applications from companies all over the kingdom; and as regarded certain undertakings—their own Company included—there was unavoidable delay. It would have been rather hard on their Company if their standard charge had been fixed at the end of 1921, with prices and conditions then ruling, without consideration of the fact that during the year their costs had been higher than they were at the end of that period. The Board of Trade, therefore, made their Order in the form indicated in the report. They gave a higher standard for 1921 than that which was to rule for the period after Dec. 31 last. Thus the Company were now selling on a therm basis—that was, a heat-unit basis—though the amount of gas consumed was still measured by volume. The declared value which they had adopted on the advice of their Engineer was 450 B.Th.U.; and the price from Jan. 1 was 1s. per therm, which compared very favourably with the price charged by many undertakings considerably larger than their own. For the benefit of those shareholders and consumers who might be mystified by the peculiar new term of the "therm," he might explain that, at their declared value, in every cubic foot of gas there were 450 British thermal units; and therefore in 1000 c.ft. there were 450,000 B.Th.U. A therm being 100,000 B.Th.U., it followed that there were 4½ therms in every 1000 c.ft., and that, at the price of 1s. per therm, the equivalent value was 4s. 6d. per 1000 c.ft. In order to elucidate the matter one degree further, let them assume that the Company had declared 500 B.Th.U., and were therefore supplying a richer gas. The price would still have been 1s. per therm; but the consumer to obtain an equivalent heat value would only have required to consume 900 c.ft., which, at 500 B.Th.U., would, of course, have enabled the Company to charge him for 4½ therms at 1s.—again 4s. 6d., or in other words, the consumer pays 4s. 6d. for 900 c.ft. of 500 gas or 4s. 6d. for 1000 c.ft. of 450 gas. In connection with both their applications, as was stated in the report, the various local authorities appeared, and adopted a perfectly reasonable attitude. Their opposition—if it might be termed opposition—was quite a fair one. They were there representing the consumers; and there was no bitterness or ill-feeling in the slightest degree manifested throughout the proceedings. In fact, the Company received testimony to their past good service on behalf of the consumers. The effect of the two Orders was summed-up in the report, as being "to distribute equitably between the consumers of gas and water the additional cost unavoidably incurred by the Company in both supplies, and to restore to a reasonable basis the dividends payable to the shareholders." He might just say in passing that they obtained both these Orders without outside assistance. Their officers gave the necessary evidence and prepared the necessary figures to be submitted at the inquiries. The effect was that water now paid more, as it should have done for some considerable time past. Gas, which was being charged at a higher price than was really necessary for the supply of gas as a separate entity, obtained relief; and the original shareholders were no longer penalized by the loss of dividend on the original capital which resulted from the unduly high price of gas.

THE ACCOUNTS.

Now, in the accounts which the Directors were placing before the shareholders, it would be found that for the first time they had separated the revenue account; and the working of the two undertakings was now apportioned as between gas and water. Where the charges could be definitely apportioned, this had been done. Where the charges were in the nature of standing charges—such as Directors' fees and officers' salaries—these and certain other charges had been apportioned on the basis of the estimated capital involved in the two separate undertakings. In order to make the report intelligible, the comparative figures for the year 1920 had been split-up, and were shown in the accounts against the two undertakings. If any shareholder should go to the trouble of trying to identify the figures, he might find some slight variation from the figures published a year ago, because they were in a slightly different form, but had been prepared on the lines adopted for the Board of Trade and the Ministry of Health.

THE WATER UNDERTAKING.

Dealing with the two undertakings separately, in the water department they would see that the balance of profit on the year was £12,759; and, of course, this showed a substantial advance on the profit for the previous year, due to the fact that, from Michaelmas, they had had the benefit of the increased water charges, which gave them an extra revenue of approximately £4000. This year, of course, the increased charges would give a further advance for the whole twelve months, which would add something like £12,000 to the profits of the water undertaking. But even the amount of profit so yielded would only be a fair proportion of the charge for dividend and interest on water capital, if it was divided up in the way he had indicated. Dealing still with the water undertaking, during the year they had laid a new pumping-up main from Longham to Alderney, so as to make their position safe, and also in view of the larger quantity of water which it was necessary to supply; and this had cost about £20,000. It was a matter which the Board had had in mind for some time; but until the cost of pipes showed some sign of falling, they had hesitated to incur the expenditure. It was laid entirely by their own staff, under the superintendence of the Manager. In the opinion of the Board it was a very creditable piece of work, and cost less than the sum for which a contractor was willing to undertake the job. The plans for a new reservoir and filters were in hand; and they might be able to make a start with this work in the course of the present year.

THE GAS BUSINESS.

Turning to the gas revenue, the total sale for the whole year showed what was, for them, the smallest increase on record. The sales were, in fact, about 1¼ p.ct. more than in 1920. This was due, in a measure, to the fact that it was an exceptional season, being very hot and bright. On the other side of the account, of course they, in common with all other gas companies, had had to face the unfortunate effect of the very serious coal strike, which had cost them, in the price they had to pay for imported coal, a sum of at least £10,000. On the other hand, they could claim—and they did claim with pride—that, in spite of the enormous difficulties with which they had been faced, a full supply of gas was maintained throughout the whole period. The sale of residuals had not been so satisfactory. It would be seen that there was a big drop in the profit on sulphate of ammonia; but coke had done better with them than had been the case with some other undertakings. They were now engaged in the erection of the new unloading machinery at Poole—another transporter—which would cost something like £24,000. They had also installed a system of waste-heat boilers, which were already giving very satisfactory results and effecting considerable savings. Their working results for the year, he said with all credit to Mr. Moon, were good. The coal gas made per ton of coal—and a good deal of the coal they had carbonized had been foreign coal—had been 13,300 c.ft. Of oil they had used considerably more, owing to a larger proportion of water gas—about another 7 p.ct.—being made than in the preceding year. The sulphate of ammonia made in the year was over 23 lbs. per ton, which was a very creditable figure; and the coke sold, and available for sale, was also very satisfactory.

A STRONG POSITION.

Taking the two undertakings together, and turning to the balance-sheet, it would be seen that the financial position was quite strong and

satisfactory. They had a substantial sum of money in hand to meet the capital expenditure that was now being incurred. Both as regarded the gas and the water departments, their workpeople had accepted the reduction in wages that was necessary in a thoroughly good and contented spirit; and he was very glad to say they would be able during this half year, with a retrospective effect to June last, to restore the co-partnership fund to something like its pre-war basis. Now that the shareholders' position had been rectified, and the dividends raised, it was only reasonable that the position of the co-partners should be recognized in the same way. He thought they would agree that a satisfactory paragraph in the report was the one dealing with dividends. At long last the shareholders' position, as he had already said, would be rectified. There had been a gradual drop in their dividends all through the war period. The Temporary Increase of Charges Act, designed to assist companies, was of no use to them, because they had such a large proportion of fixed dividend capital, which came in front of the ordinary capital.

THE WAR MEMORIAL.

In June last, he had the honour, in company with his colleagues, of unveiling at the Poole Hill Office the memorial—which was really a very chaste and dignified memorial—to their men who went to the war. There were recorded the names of 27 employees who died, and 271 other men who served with His Majesty's forces, on land and sea, all over the world.

THE DIRECTOR OF GAS ADMINISTRATION.

Before closing, he would like to mention two matters which had affected their Company, and had also affected the gas industry as a whole. The first had relation to the proceedings under the Gas Regulation Act. The Board of Trade appointed to deal with these matters, as Director of Gas Administration, Mr. H. C. Honey, one of their principal officers; and he (the Chairman) desired to bear his testimony to the fact that throughout the enormous number of inquiries which Mr. Honey had had to hold, he had treated the gas industry with great patience. Mr. Honey was quite fair-minded, and had held the balance evenly between consumers, local authorities, and shareholders. He (Mr. Cash) had attended a great many inquiries before him, and quite saw that it was his wish to do what was fair to the investor and to the public. Mr. Honey was sympathetic to the burdens upon both. No doubt, he had been overworked in consequence of the enormous number of applications; but it had certainly been an advantage to the industry that one gentleman, who had of course become thoroughly efficient and *au fait* with all the facts, should have dealt with the whole of the applications. The earlier Orders—those of companies first in the list—were doubtless somewhat more favourable; but this was inevitable.

THE QUESTION OF REVISION.

The other matter was the question of revision. The Gas Regulation Act provided "that, if at any time it is shown to the satisfaction of the Board of Trade that the costs and charges of and incidental to the production and supply of gas have substantially altered from circumstances beyond the control of, or which could not reasonably have been avoided by the undertakers, the Board may, if they think fit, on the application of the undertakers or of the local authority or, where the local authority are the undertakers, of twenty consumers, make an amending Order correspondingly revising the powers of charging authorized by the original Order." Now, in this respect, he did venture to hope that local authorities and consumers would use sparingly any rights which they thought they might have. Otherwise it seemed to him that, if at any time a company happened to be doing better as the result of good management, and so forth, though the words were designed to cover only matters beyond control, there might be requests for revision which would have the effect of cutting at the whole basis of the sliding-scale. In other words, the incentive to economy would be in jeopardy. As to the future, he thought they might look forward to this with confidence. Prices were coming down. Of course, they all recognized that the price of gas must be lowered still further. How far this could be done during the present year, he would not care to prophesy; but he did believe they would be able to make another reduction, though it depended in a considerable measure on extraneous matters—such as railway charges, freight rates, and local taxes, &c.

The DEPUTY-CHAIRMAN (Mr. Charles L. Morgan, C.B.E) formally seconded the motion.

Mr. A. W. OKE said he wished to congratulate the Directors and the Engineer on the very excellent report that had been presented. The outstanding feature was that they had obtained a satisfactory Order from the Board of Trade. One must not, however, lose sight of the serious remarks the Chairman had made as to the difficult rock—the power of revision—that lay before all gas companies, and especially those working under the sliding-scale. This scarcely seemed fair, and should be watched carefully. Of course, their own Company occupied a somewhat peculiar position, because it was an undertaking working gas and water together, and the accounts had never before been separated. He thought they must all feel that the terms obtained were good; and they were indebted to the Chairman for the full information he had laid before them, which placed the shareholders in possession of the whole of the facts. With the low price of gas in Bournemouth and the moderate charge for water, it seemed to him that the shareholders might look forward to the future with confidence, and the consumers might regard themselves as fortunate that the gas and water supplies were in the hands of a private company, and not of the local authority. He would like, as the result of his own experience, to express his agreement with what the Chairman had said about Mr. Honey.

The motion was then put to the meeting, and carried unanimously.

THE DIVIDENDS.

The CHAIRMAN proposed that the interim dividends to June 30, at the rates per annum of 6 p.ct. on the preference shares, 7 p.ct. on the "B" shares, and £4 12s. 6d. p.ct. on the original shares, be confirmed; and that dividends for the second half year be declared, at the rates per annum of 6 p.ct. on the preference shares, 7 p.ct. on the "B" shares, and £7 17s. 6d. p.ct. on the original shares. He explained that their Order was operative over the last six months, and they were deemed to be selling gas on the therm basis. This was the statutory dividend they were entitled to under the new standard. He thought the shareholders would be gratified that their dividend had risen from £4 12s. 6d. to £7 17s. 6d., which was nearer their pre-war position.

The Right Hon. Sir DANIEL F. GODDARD seconded the proposition, which was agreed to.

A RE-ELECTION AND A NEW AUDITOR.

The CHAIRMAN said he had now great pleasure in moving that Sir Daniel F. Goddard be re-elected a Director of the Company. No words of his were necessary to commend Sir Daniel's name to the shareholders. They knew him there as a very valuable member of the Board; and he was also known throughout the gas industry as a gentleman who had been intimately connected with the manufacture and supply of gas for a great number of years. He was a Director of still larger undertakings than theirs.

The motion was seconded by Sir CHARLES J. JESSEL, Bart., and unanimously passed.

The CHAIRMAN said that Mr. R. H. Glen, F.C.A., and Mr. F. G. Barrett had been the Company's Auditors; and on this occasion Mr. Barrett would have retired. Unfortunately, however, he had passed away; and they greatly regretted having lost him. He had been associated with the Company for 28 years as Auditor, and throughout that period had performed efficient services. An intimation had been received from Mr. Lewis Hardy, F.C.A., of his intention to offer himself as a candidate. Many of them knew Mr. Hardy, who was Auditor for several gas companies.

Mr. Hardy's appointment was agreed to, on the motion of Mr. WOOD, seconded by Lieut.-Col. HAROLD W. WOODALL.

The CHAIRMAN remarked that in this connection there was one other little matter which he wished to bring to the notice of the shareholders. During the whole of last year (Mr. Barrett having died in March), Mr. Glen had carried out the auditing work; and the Directors thought, therefore, it was not at all unreasonable that he should be paid the double fee.

This was agreed to, on the proposition of Mr. WOOD, seconded by Mr. CHURCH.

Mr. GLEN, in acknowledgment, expressed his great regret at the loss of his late colleague.

VOTES OF THANKS.

The CHAIRMAN next moved a vote of thanks to the officers, staff, and workpeople, for their services during the past year. They had for a great number of years said in that room how well they had been served by their officers; and he could only repeat that this was so, from the highest officers down to the workpeople. Their relations with the workpeople were good. It had been a difficult year; but he thought both officers and men had acquitted themselves extraordinarily well. He proposed the acknowledgment of this fact in the fullest sense; and he would ask the General Manager and the Secretary to convey the vote of thanks to their respective staffs and the workpeople.

Mr. E. HONORATUS LLOYD, K.C., seconded the vote, which was heartily accorded.

Mr. PHILIP G. G. MOON (the Engineer and General Manager) said he was sure that every official and every employee at Bournemouth would very much appreciate the vote of thanks so cordially given; and he would like, on their behalf, to thank the Directors and shareholders very sincerely. He was glad to be able to say—and he did so very confidently—that the best spirit prevailed among the staff and the employees generally at Bournemouth. They, in the best sense of the term, loyally co-operated in everything that was for the good of the Company, and he thought exhibited the truest spirit of co-partnership. Co-partnership now had become with them something more than a name—something more than the taking of a yearly bonus. It had become with them a living force. He thought that perhaps their Works Magazine, which was now well into its second year, had contributed to some extent to this, and had encouraged that spirit of high and efficient public service which they tried to instil into the minds of every officer and workman. There were a certain number of fresh and interesting problems to be faced in the coming year. The question of how to get the greatest number of heat units in a gaseous form from a ton of coal was one of them. But they would face these matters with great confidence, feeling, as they did, that they would be loyally and enthusiastically supported by every member of the staff. He was sure that every employee in Bournemouth was proud to belong to the Company; and this spirit must inevitably lead to good work.

Mr. PLUMB also, on behalf of the London staff, returned thanks. He remarked that the Orders had, of course, led to a lot of figure-work; and some members of the staff had had to work fairly hard to prepare the necessary material for the two inquiries. The Company came through very well; and he thought that everybody was to be congratulated upon the result.

Lieut.-Col. WOODALL proposed a hearty vote of thanks to the Chairman and Directors for the way in which they had conducted the business of the Company during the past year, and in doing so referred to the question that had been raised in connection with the revision of Orders. He said an allusion had been made to the unfairness of this provision; but he did not think this was quite the correct word to use, because in his opinion this revision would work both ways. It was, he believed, with a fair idea that it was introduced, though it might work inequitably if not reasonably employed.

Mr. GLEN seconded the vote, which was passed, and briefly acknowledged by the CHAIRMAN.

The Fertilizers Manufacturers' Association and the British Sulphate of Ammonia Federation have placed at the disposal of the Committee of the Rothamsted Experimental Station, Harpenden, funds which have enabled them to appoint a special member of the staff to explain the plots to farmers and other visitors; and Mr. H. V. Garner, of the School of Agriculture, Cambridge, has accepted the post.

CROYDON GAS COMPANY.

Half-Yearly Meeting.

For thirty years Chairman of the Croydon Gas Company, Mr. CHARLES HUSSEY, J.P., was unanimously re-elected to that position last Friday afternoon, at the 150th ordinary half-yearly meeting of the proprietors. The Directors' report, submitted to a large gathering in the Lecture Hall of the Company's Offices, Katharine Street, Croydon, was given on p. 393 of last week's "JOURNAL."

The CHAIRMAN, on rising to move the adoption of the report and accounts, said they could regard with satisfaction the half year just ended; and he did not hesitate to say that the outlook for the future was also good. One of the aims the Directors kept most constantly before them was to sell gas at the lowest possible price consistent with supplying it of satisfactory and uniform quality, and giving to consumers a service which enabled them to obtain the best results from its use. They found themselves now past the peak of high prices, and able to announce reductions in the price of gas which they hoped would prove to be the forerunner of continued and substantial reductions in the future. Already they had made—in January—a reduction which meant a gain to the consumers exceeding £30,000 a year, and were announcing a reduction in April representing a further £15,000. Their price compared favourably with that of most of the Metropolitan and Suburban Companies, and would, he hoped and believed, continue to do so. In the last half year they had gained slightly from reduced cost of coal, which would show substantial further gains this year; while they had a welcome relief in the lower cost of oil. Prices of materials generally were on the downward grade; and wages in the gas industry were now, by a national agreement come to last year with the representatives of the gas workers, subject to automatic re-adjustment in accordance with the official figures for the cost of living. On the other side they had, as was but natural, to face a considerable decrease in the receipts from residuals. In the half year they had to record a slight decrease in sales of gas, due in part to the after-effects of the coal strike, and largely to the unusually fine weather experienced during the greater part of the six months. An increase in the half year of 1311 consumers, and of 2758 stoves hired or sold, with, in addition, a considerable sale of appliances for industrial and other uses of gas, indicated that, under comparable conditions of weather, they would have a substantial increase in output—as, indeed, they were already finding to be the case. Making a comparison over twelve months, the gross profit for 1921 was £81,000, against £62,000 in 1920—a gain of £19,000. This met the considerable increase in dividends consequent upon the welcome change to pre-war rates. It had, in addition, to provide interest on the large amount of capital raised to meet reconstructions and extensions which normally would have been carried out over the last seven years, but which had, on account of the war, to be deferred. Expenditure on capital account during 1920 and 1921 was some £260,000; and they would have to spend about a further £50,000, to place them in a position in which they could economically and efficiently cope with the increased business already secured, and which they saw in front of them during the next few years. This would necessitate the raising of further capital. The revenue from sales of gas for 1921 was higher by £75,000 than in 1920; and that from rental of meters, stoves, and fittings, £1820 more. Sales already represented the substantial total of 1964 million c.ft. in the year. In October, the valve was turned which admitted gas to the new holder at Waddon, which, as an adjunct to the plant, they had sorely needed since it was started over seven years ago. It had already sensibly lessened the difficulties and anxieties during the time of mid-winter output of the Company's Manager (Mr. Archibald Caddick), to whom congratulations were due for the completion of a successful piece of work. In the last half year they had been able, after providing for dividends at the pre-war rates, to make appropriations from the net revenue account amounting to £4700, and to carry forward, after paying dividends, £8620—together £13,300, or £1000 more than the carry-forward and the sum which they had to take from the reserve fund in June, as a consequence of the losses caused by the coal strike.

Mr. THOMAS RIGBY (Deputy-Chairman), seconding the adoption of the report and accounts—which were passed with acclamation—made reference to the new holder, which cost upwards of £100,000. They had no outside opinion about the holder, he said, and the shareholders might feel that they had saved a considerable sum in fees.

The resolution declaring the dividends was proposed by Mr. W. CASH, and seconded by Mr. H. WOODALL; and the re-election of Mr. Hussey as Chairman was moved, amid enthusiasm, by the DEPUTY-CHAIRMAN. Mr. Samuel Spencer was re-elected a Director and Mr. F. S. Sloman Auditor.

Thanks were accorded the Directors, on the proposition of Mr. C. WEBB, seconded by Dr. J. H. RODMAN; and the CHAIRMAN, in acknowledgment, praised the services of the officers, staff, and workmen—particularly mentioning Mr. Caddick (Engineer and Works Manager), Mr. W. J. Sandeman (Distributing Engineer and Sales Manager), Mr. W. W. Topley (Secretary and Accountant).

Price Reduced at St. Helens.—The St. Helens Gas Committee have decided to reduce the price of gas from 4s. 9d. to 4s. per 1000 c.ft. The price was raised last October. Discounts to large consumers which were disallowed twelve months ago are again to be granted.

A Belfast Explosion.—Gas generated by the bitumen of an electric cable which had been fused is stated to have been the cause of an alarming explosion which took place in Oldpark Road, Belfast, on Thursday morning last, and which resulted in great damage to the fronts of three dwelling houses and injury to some of the occupants. Mr. J. D. Smith, the Manager of the Corporation Gas-Works, ordered a thorough investigation, which led to a finding that the gas-meters in the houses remained intact. In Mr. Smith's opinion, an escape in a small jet in one of the houses could not have generated such force as would be necessary to cause the damage. In each of the houses ceilings fell in, windows were broken, and huge cracks appeared in the walls. The front walls were practically blown away.

BRISTOL GAS COMPANY.

The report of the Directors of the Bristol Gas Company for the year ended Dec. 31 states that, notwithstanding the depressed industrial conditions, the demand for gas has been satisfactory. There has, however, been a considerable reduction in the value of residual products. During the whole of the period of the national coal stoppage, the Company maintained a full supply of gas, which entailed the purchase of foreign coal at very heavy additional cost. The price of gas has been reduced from Jan. 1 last. Application has been made to the Board of Trade for an Order under the Gas Regulation Act; and the new method of charging on the basis of the heating value of the gas will be introduced during the current year. The Directors recommended that a dividend be declared for the half year ended Dec. 31 at the rate of 5 p.ct. per annum on the nominal capital of the Company entitled to dividend.

Moving the adoption of the report, Sir George E. Davies (the Deputy-Chairman), who presided owing to the indisposition of the Chairman (Mr. J. H. Howell), read a statement by Mr. Howell in which he said that the Directors, anticipating the coal strike, took every precaution to ensure a constant supply of gas to the city and neighbourhood by accumulating a large stock of coal and oil, and, by their foresight, were enabled to give a supply at full pressure till the end of the strike, though during the last few weeks they had to import coal from Belgium, France, and America, at an additional cost beyond the English price of over £25,000. The Directors desired to place on record their thanks to the Secretary and Commercial Manager (Mr. S. E. Halliwell), and to the Engineer and Works Manager (Mr. R. Robertson), the Superintendents of the various works, the staff, officials, and workmen, for their devotion in a very anxious time. It might be of interest to the shareholders and the public to know that, whereas the average price of gas coal in 1913 was 14s. 10d. per ton, it was 41s. 4d. in 1920, and 45s. 7d. in 1921—the last high figure being due to the enforced purchase of foreign coal at exorbitant figures during the coal strike. Wages in 1914 were:

	£57,322, or	4¾d. per 1000 c.ft.
In 1920 . . .	£197,866, or	15d. ,,
In 1921 . . .	£188,069, or	14¼d. ,,

The increase in railway rates—as compared with pre-war charges—amounted to £33,000 per annum, which represented 2½d. per 1000 c ft., while recent concessions affected local supplies only. Local rates had increased from £14,368 in 1914 to £27,764 in 1921—or 2d. per 1000 c.ft. of gas sold. Repairs to works and mains, deferred largely during the war, were now being energetically carried out; and ample supplies of gas at adequate pressures were available for all purposes. The progress of the Company was shown by the following figures:

In 1900	2062 million c.ft.	was made.
In 1910	2777 ,,	,,
In 1920	3481 ,,	,,
In 1921	3448 ,,	,,

The slight falling-off (under 1 p.ct.) in 1921 was entirely due to the restrictions imposed by the Government during the thirteen weeks of the coal stoppage, the depressed industrial conditions during the whole of the year, and the abnormal weather conditions. Of the consumers, 90 p.ct. used gas for cooking; and nearly 60 p.ct. of the gas was used in the hours of daylight.

The report was adopted, and the dividend recommended was declared.

LEIGHTON BUZZARD GAS CHARGES.

The differences of opinion between the four local authorities in the Leighton Buzzard gas-consuming area regarding the payments of accounts incurred at the recent hearing of the Gas Company's application to the Board of Trade were settled on Thursday last; the authorities' Joint Committee deciding to pay all the accounts in full, and in the proportions previously agreed upon. The Chairman (Mr. H. W. Clough) said in his opinion there had been misunderstanding with regard to the accounts. They came before the Leighton Council, and were passed for payment in the usual way, and were then sent to London to be taxed.

The meeting next proceeded to deal with a lengthy report presented by Mr. R. F. A. Tutt (Clerk to the Leighton Buzzard Council), which stated that the action of the Leighton Council in passing the accounts was merely for the purposes of internal administration, and that each Council would have to do the same thing eventually. Dr. Harris did not understand why the Leighton Council had taken upon themselves to pass the bills before they came before the Joint Committee, upon which Mr. Bodsworth exclaimed that one of the Councils must accept responsibility for the total amount and the payment, and that possibly the error had occurred through the Leighton Council's taking it upon themselves without the consent of the Joint Committee.

Previous reports in the "JOURNAL" dealing with this matter appeared in the issues of Jan. 25 (p. 218) and Feb. 15 (p. 401).

Reductions in Scotland.—Dunfermline gas is lowered in price from 4s. 2d. to 3s. 11d. per 1000 c.ft.; and at Peterhead, the Gas Committee and the Town Council have reduced the rate from 7s. 3d. to 6s. 8d. per 1000 c.ft.

A Defective Gas-Tap.—"People who let lodgings to complete strangers should tell them if the gas-fittings are defective," said Lieut.-Col. H. Parker, Deputy-Coroner, at an inquest at Preston on David Connor, a musician in the orchestra of the Carl Rosa Opera Company. Detective-Sergeant Garth said the bedroom was only a small one; and Connor must have got out of bed in order to turn the gas out. The pin on the tap was missing, and the tap would complete a circle. There was neither fireplace nor ventilation in the room. The Deputy-Coroner, returning a verdict of "Accidental death," said the defective gas-tap had caused the whole trouble; and the affair was a pure accident.

VERTICAL RETORTS AT HINCKLEY.

An Expenditure of £40,000.

An inquiry has been held at Hinckley, in connection with the application of the Urban District Council for sanction to borrow £40,000 for the construction of vertical retorts and other additions at the Hinckley Gas-Works. The inquiry was held by Mr. F. Gregson Williams, of the Ministry of Health.

During the proceedings, it was stated that the present carbonizing plant at the works was inadequate. It was capable of producing 500,000 c.ft. of gas in 24 hours, when fully in use. A margin of one-fifth was necessary for safe working and repairs. The output of the works last year reached 580,000 c.ft. in 24 hours, and was increasing. This year the maximum quantity sent out in 24 hours was 653,000 c.ft. There were 120 new houses erected, or being built, all of which would be supplied exclusively with gas. Other buildings were being put up; and as soon as the cost of building was reduced, no doubt there would be a considerable number of new houses. The new plant would produce 750,000 c.ft. of gas in 24 hours. A small water-gas apparatus was installed last year, to assist in keeping-up the supply of gas until the new plant was erected; but this was only a stand-by supply. A tender for the new plant had been accepted from the Woodall-Duckham Vertical Retort Company, for nearly £38,000, subject to the approval of the Board of Trade and the Ministry of Health. The total cost of the installation was estimated to be £40,000.

There was no opposition to the proposal of the Council.

GAS STORAGE CAPACITY AND CONSUMPTION.

Reporting on an £80,000 scheme to increase the storage capacity by the erection of a new gasholder, the Burnley Corporation Gas Committee state that in February, 1913, they decided that extensions of the gas-making plant were necessary; and the purchase of a plot of land at Old Hall Farm was decided upon. In August, 1919, the necessary parliamentary powers were obtained for the development of the site. The purchase of the land has not yet been completed; but it is proposed to complete forthwith, as the need for increased gasholder capacity is one that should be met immediately. The capacity of the existing holders is about 2,450,000 c.ft.—a quantity which has frequently been consumed in winter in less than twelve hours.

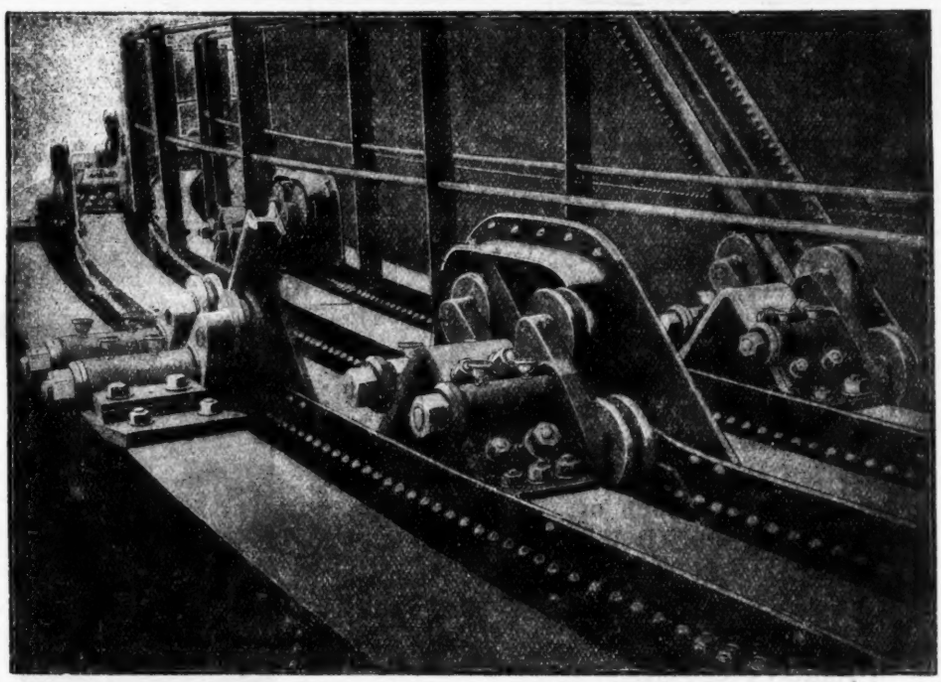
Inquiries which have been made of ten towns similar in size to Burnley, with respect to the percentage storage capacity as compared with the daily consumption, show that these towns have a storage percentage in every case greater than that of Burnley, which has only a storage capacity of 64 p.cent. At Blackpool and Blackburn, where the respective percentages are 83·5 and 119·5, an early extension in the holder capacity is contemplated. It should be observed that, notwithstanding the prevailing trade depression, more gas is being made than at any previous period in the history of the works. It is therefore to be expected that, on an improvement in trade taking place, much more gas will be consumed than at present. Should there be no increase made in the storage capacity, there will be a pecuniary loss resulting from increased costs in manufacture, diminished profits when pressure has to be curtailed, serious complaints from customers, and loss of business through consumers losing confidence in the supply of gas. A further important factor to be considered is that, under the Burnley Gas (Charges) Order, 1921, which is now in operation, the Corporation are liable to penalties if the calorific power of the gas supplied falls 5 p.ct. short of the declared value (viz., 475 B.Th.U.). With the present storage capacity, it will be very difficult to maintain this declared value.

Having regard to the foregoing circumstances, the Gas Committee have passed a resolution that, subject to the approval of the Finance Committee, the Town Clerk be instructed to apply to the Ministry of Health for sanction to borrow a sum of £80,000 for the erection of a new gasholder.

Flixton and the Stretford Gas Bill.—At a meeting of Flixton ratepayers, a protest against the inclusion of the parish in the area affected by the Stretford Gas Board Bill was carried by 244 votes to 2.

Bromsgrove Gas Company.—Mr. J. Green presided at the meeting of the shareholders last week, when the Directors reported that, after paying interest on debenture bonds, there was a loss of £56, which, deducted from last year's balance, left a disposable sum of £2579. They recommended the payment of dividends of 7 p.ct. for the year on the original shares, and £4 18s. p.ct. on the "B" shares (less income-tax), leaving £1449 to be carried forward. The Chairman said the present year had opened with much brighter prospects—with a considerable reduction in the price of coal, and also lower wages.

Barry Gas and Electricity Schemes.—A special meeting of the Barry Gas and Water Committee considered in private last Thursday the report of a firm of Consulting Engineers on the question of extending and bringing up to date the gas-works and embarking upon an electricity scheme. It is stated that the report recommends the Council to expend £125,000 in bringing the carbonizing plant at the gas-works to a state of efficiency to meet the demands of the town. This expenditure would place Barry in the position of more than doubling its carbonizing plant, would give more than double the present storage, and would result in a greatly increased make of gas and residuals per ton of coal carbonized. In regard to electricity, the Engineers consulted are of the opinion that it is desirable for the Council to proceed with an electricity supply scheme. They estimate the initial outlay at £20,000, and that this expenditure would mean a saving on the gas-works extensions of £4000.



THE NEW "BEARSCOT" TWIN GUIDE ROLLERS

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MANCHESTER.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *Feb.* 20.

Pitch continues a very firm market, and 70s. per ton is reported as having been paid. Makers are very fully committed, and have very little pitch left for sale for this season's delivery. The price is called to-day from 72s. 6d. to 75s. per ton f.o.b. makers' works. Creosote is steady at about 6¼d. to 6½d. per gallon. Solvent naphtha 95-160 is quiet; the price being from 2s. 9d. to 3s. per gallon. Pure benzole and pure toluole are about 3s. 6d. per gallon. Pyridine bases is in fair demand at about 6s. per gallon, into buyers' drums. Other products remain unaltered.

Tar Products in the Provinces.

Feb. 20.

The market for tar products has been quietly steady throughout the past week. Pitch has again somewhat improved in value, and there is a firm tone all round; but the general impression appears to be that the recent improvement was due to failure by the Germans to deliver in France and Belgium quantities sold by them. This was possibly the result of railway troubles; but it is reported that in March they will resume deliveries at normal rate. Creosote is still very quiet; but with one or two exceptions there is no pressure to sell, and makers appear generally to be of opinion that there will be an improvement in the market when the make drops-off owing to short supplies of tar and demand for the roads. Solvent and heavy naphtha are both quiet, and there is very little demand for same. Carbolic acid remains firm, owing to the demand from the Continent. Cresylic acid is quiet; while naphthalene remains quite neglected.

The average values for gas-works products during last week were: Gas-works coal tar, 32s 6d. to 37s. 6d. Pitch, East Coast, 68s. to 70s. f.o.b.; and 66s. to 68s. f.a.s. West Coast—Manchester, 62s. 6d. to 65s.; Liverpool, 62s. 6d. to 65s.; Clyde, 65s. to 67s. 6d. Benzole 90 p.ct. North, 2s. 2d. to 2s. 3d.; crude 65 p.ct. at 120° C., 1s. 5½d. to 1s. 6½d. naked at makers' works; 50-90 p.ct., naked, North, 2s. 2d. to 2s. 3d. Toluole, naked, North, 2s. 3d. to 2s. 6d. nominal. Coal tar crude naphtha in bulk, North, 9½d. to 10½d. Solvent naphtha, naked, North, 2s. 2d. to 2s. 5d. Heavy naphtha, North, 2s. 1d. to 2s. 3d. Creosote, in bulk, North, liquid, 4⅝d. to 5d.; salty, 4½d. to 4⅝d.; Scotland, 4¼d. to 4⅜d. Heavy oils, in bulk, North, 6¼d. to 6⅜d. Carbolic acid, 60 p.ct., 2s. Naphthalene, £12 to £15; salts, £5 to £5 10s., bags included. Anthracene, "A" quality, 5d. to 6d. per minimum 40 p.ct.; "B" unsaleable.

FROM A MARKET CORRESPONDENT.

Bye-Products Trade.

There is very little change in these materials except for pitch, in which commodity strength is maintained and the quotation has risen to about 67s. 6d. per ton. In the later months of last year there was considerable forward selling at much lower quotations. These sellers are now in a somewhat unfortunate position, as they find it very difficult to cover their sales. With fuel prices still high generally, pitch at 67s. 6d. for briquette making is not dear; and it is quite possible that quotations may be carried still further upward. Naphthalenes are dull, with very little inquiry for refined at £16 per ton; while crude is being fairly well absorbed by the firelighter trade at from £5 to £7 per ton. There is not much demand for solvent naphtha at 2s. 7d. to 2s. 9d. per gallon. These remarks apply to creosote, though the price keeps fairly steady at about 5½d. per gallon. Cresylic acid makes from 2s. 3d. to 2s. 6d. per gallon, according to quality; but very little is doing in carbolic acid. Producers do not find it worth while to extract it, and makers of crystals find difficulty in obtaining more than 5½d. per lb., and, consequently, cannot pay more than 1s. 6d. per gallon for crude. Benzole is easier, probably in expectation of cheaper petrol. The latest value for 90's is 2s. 6d. per gallon; pure benzole is worth 3s. A small volume of business continues to be done in intermediate products, and there seems every probability of a better demand in the near future. The export market is quiet; but here, too, the volume of inquiries is increasing. Aniline oil and salt are being taken on both home and export account at last quotations. Beta naphthol is quiet at 2s. per lb.; but there are no re-sale lots on offer. Resorcin remains at 6s. per lb., and salicylic acid at 1s. per lb.

Sulphate of Ammonia.

There is a good demand on both home and export account, although very few sales for abroad have been completed lately owing to a shortage of material, which, at the present time, is being reserved mainly for the home demand. The output is, of course, very small; and if the home demand should become normal, it is almost certain that higher prices will be seen for sulphate of ammonia, and it will also be necessary to import from the Continent.

At a meeting of the Evesham Town Council last Thursday, the Mayor said the financial position of the gas undertaking had given them anxiety; but it was thought they had now passed the critical period, and that they would gradually get back to their pre-war position.

The Engineering and Building Construction Students of the Regent Street Polytechnic (Rambling Section) paid a visit to the subways of the City of London on Saturday last. They were met by Mr. W. J. Liberty, Public Lighting Inspector of the Corporation of London, who conducted them through the labyrinth of underground streets, and explained their history and utility, the method of main-laying, and the ease with which gas and other supplies could be connected to buildings. At the conclusion of the visit, a hearty vote of thanks was accorded for the privilege of the inspection.

By Appointment.
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Gas-Heater Fatality at Birkdale.—A verdict of "Death from misadventure" was returned at an inquest at Southport on two domestic servants who were found in bed gassed at their employer's residence in Birkdale. The room was full of gas, and the jet was turned half on. Attached to it was a small asbestos heater, containing a large number of perforations, which it was presumed the maids had left burning for the sake of warmth. Mr. Philip H. Christian (Outdoor Superintendent of the Corporation Gas Department) said the gas pressure was reduced somewhat just before midnight, and put on again early in the morning. If the burner was giving a small light, he did not think the reduction of pressure would cause it to go out. The Deputy-Coroner said his opinion was that the reduced pressure of gas had caused it to go out; and when the pressure had been put on again, it had filled the room with gas, and so caused the death of the two women.

Lighting Maintenance Scheme at Manchester.—Attention was drawn by Mr. Leigh, at a meeting of the Manchester Ironmongers' Association, to the effect that the Manchester Corporation were now advertising an incandescent gas-lighting maintenance service, with quoted prices for mantles, burners, &c. Mr. Luke said the scheme affected ironmongers very seriously as regarded gas-fittings. He could not see how it was possible to sell at the prices that were quoted, and make a profit. Mr. Buss pointed out that the same trouble occurred in 1913; and a joint deputation from the Ironmongers' Association and the Master Plumbers' Association waited upon the Gas Committee. They were very well received, and the practice of supplying fittings was dropped. After further discussion, it was agreed to put the matter in the hands of Mr. Leigh, to arrange with the Retail Traders' Association and the Plumbers' Association for a deputation to the Gas Committee.

STOCK MARKET REPORT.

THE week just closed on the Stock Exchange was noteworthy for brilliance. Government issues were the centre of attraction; the leaders in the Home list attaining record figures, and the quotations of the big four on Friday reading thus: Consols 54-56½, War Loan 94⅞ 96¼, Funding 80⅛ 80⅞, Victory 84 15/16-86. Bonds, Local loans, and Colonials followed suit, and Indians recovered partially.

Business in the Gas Market was brisk and cheerful. Most of the larger companies' accounts are in circulation, and many have already been followed by the respective general meetings, the proceedings at which have agreeably confirmed the pleasing impression produced by the published figures. The market has thus gathered additional strength. Gas Light ordinary and the three Commercials had a smart rise. In Suburban and Provincial, Alliance and Dublin rose 6, Bournemouth 5 p.c.t. 1¼, Brentford "A" and "B" 2 each, Croydon "A" 32½, ditto "B" and "C" 26½, Maidstone debenture 3, South Suburban 2, ditto debenture 3, Southampton debenture 2, Tottenham "A" and "B" 1 each, Wandsworth "A" 2, ditto "B" 5½, and the other issues 5 each. In the Continentals, European and Imperial were steady and unchanged, and there were a few dealings in Primitivas at the latest prices.

Bargains done for cash during the week were as follows: On Monday, Brentford "A" 82, Commercial 3½ p ct. 65, Gas Light ordinary 74½, 74⅞, 74¼ 74⅜ 74½ 75, ditto preference 69¼, 69⅜ 71, Imperial Continental 135, 135½, 136, 136¼, 137, Monte Video 54, Primitiva 1911 debenture 54, 54¼, South Metropolitan 76½, 76⅜, ditto 6½ p.cct. debenture 104⅜, Liverpool 7 p.ct preference 101½ 103. On Tuesday Alliance and Dublin 54⅛ 54⅜, Brentford "A" 83 84, 86, ditto "B" 85, Croydon "B" 155, 155½, Gas Light ordinary, 73¼, 74¼, 74⅜ 75, ditto maximum, 54, 54¼, ditto debenture 54, Imperial Continental 135, 135½, 136, Monte Video 55, 55½, Primitiva 14s., ditto preference 41s., 41s. 3d., ditto 1911 debenture 54, South Metropolitan 76½, 76¾, 77, 77¼, ditto 6½ p.ct. debenture 104½, Liverpool 7 p.ct. preference £30 paid 32-32¾. On Wednesday, Alliance and Dublin 54⅛, Commercial 4 p.ct. 65, ditto 3½ p.ct. 65½, Continental Union 18½, European 88⅜, Gas Light ordinary 74½, 74⅜, 75, 75⅛, 75½, ditto maximum 54½, 55⅛, dittto preference 69⅜, Imperial Continental 133, 134, 135, 136, Primitiva 14s. 3d., ditto preference, 40s., ditto 1911 debenture 54½, South Metropolitan 76½, South Suburban 87½, 88, Wandsworth "B" 66, 67, ditto "C" 63, ditto Wimbledon 65, Bristol 4 p.ct. debenture 65, Liverpool 7 p.ct. preference 103, ditto £30 paid 32-33 On Thursday, Bombay 3½, Bournemouth preference 8⅛, 8⅜, Commercial 4 p.ct. 70, Croydon "C" 154½, 155, Gas Light ordinary 75, 75⅛, 75⅛, 75 13/16, ditto maximum 54⅜, Ilford "B" 87, Imperial Continental 134⅜, 135½, 135½, 136, Monte Video 55½, Primitiva preference 40s. 3d., South Metropolitan 76½, 77, 77¼, South Suburban 88, 89½, Wandsworth "B" 70, ditto "C" 68, Liverpool 7 p.ct. preference 102⅞, Kingston-on-Thames 70, 70¼, Sutton ordinary 57. On Friday, British debenture 60, Commercial 3½ p.ct. 70, Continental Union 18⅛, European 8½, Gas Light ordinary 75½, 75⅝, 76, ditto maximum 55, 55⅛, 55⅜, 55⅝, ditto preference 70, Imperial Continental 135½, 136, 137, Monte Video 55, Primitiva preference 41s., South Metropolitan 76, 76⅛, 77, 77⅛, South Suburban 88½, Liverpool 7 p.ct. preference £30 paid 32⅝ 33⅝, Sutton ordinary 58.

In the Money Market, the dominant event of the week was the long-desired lowering of the Bank rate on Thursday from 5 p.ct. (fixed on Nov. 3) to 4½ p.ct.

ANTE-WAR PRICES AND DIVIDENDS, LATEST DIVIDENDS, AND LAST WEEK'S BARGAINS.

Issue.	Shares.	When ex-Dividend.	Ante-War Dividend & Bonus.	Last Dividend.	NAME.	Closing Prices, July 30, 1914.	Present Prices.	Lowest and Highest Prices of Bargains.
£			p.e.					
182,049	Stk	Aug. 26	4	4%	Aldershot 4 p.e. Pref.	...	50—55	
1,551,868	,,	Oct. 13	2½	1 5/8%	Alliance & Dublin Ord.	59—64	58—61	54½—54⅝
374,000	,,	Jan. 12	4	4%	Do. 4 p.e. Deb.	76—79	46—51	
280,000	5	Nov. 30	7½	4/-	Bombay, Ltd.	5½—6⅛	5½—5⅝	3½
100,000	5	Aug. 11	16	4/7½	Bournemouth Gas & Water: 5 p.e.	...	9—10	...
383,110	10	,,	7	7/-	Bournemouth Gas & Water: B 7 p.e.	15—15½	8½—9⅛	...
115,000	10	,,	6	6/-	Bournemouth Gas & Water: Pref. 6 p.e.	13½—14	7⅛—8⅛	8⅛—8½
162,065	—	Dec. 30	—	4%	Bournemouth Gas & Water: 4 p.e. Deb.	...	60—65	...
992,045	Stk.	Feb. 9	14	56/-	Brentford A Consolid.	261—266	82—87*	82—86
734,920	,,	,,	11	55/-	Do. B New	204—209	82—87*	83
55,000	,,	,,	5	5%	Do. 5 p.e. Pref.	109—111	66—70*	...
221,400	,,	Dec. 15	4	4%	Do. 4 p.e. Deb.	91—95	60—62	...
214,775	,,	Aug. 26	11	10½%	Brighton & Hove Orig.	208—215	132—137	...
244,200	,,	,,	8	7½%	Do. A Ord. Stk.	134—139	92—97	...
1,287,500	Stk.	July 28	5	5%	Bristol 5 p.c. max.	...	...	...
530,000	20	Sept. 29	12½	10%	British	44—45	26—28	...
120,000	Stk.	Dec. 30	4	4%	Do. 4 p.e. Deb. Stk.	88—90	59—64	60
245,771	,,	,,	4	4%	Buenos Aires 4 p.e. Deb.	85—87	50—55	
100,000	10	May 27	—	6%	Cape Town & Dis., Ltd.	1¼—2⅛	6—7	...
100,000	10	Oct. 28	—	4½%	Do. 4½ p.e. Pref.	4—6	4½—5½	...
100,000	Stk.	Dec. 30	4½	4½%	Do. 4½ p.e. Deb. Stk.	70—75	40 60	...
137,150	,,	Feb. 26	5	5%	Chester 5 p.e. Ord.	108—110	...	...
1,513,280	,,	July 28	5/9/4	42/8	Commercial 4 p.e. Stk	106—108	67—72	65—70
150,000	,,	,,	5½	5 8/4	Do. 3½ p.e. do	105—105	66—71	65—70
475,000	,,	—	5	5%	Do. 3 p.e. Deb. Stk	69½—71½	40—52	...
800,000	,,	Dec. 15	4	—	Continental Union Ltd	76—79	18—20	18½
200,000	,,	,,	7	—	Do. 7 p.e. Pref	115—118	33—38	
51,600	,,	Aug. 26	15	15%	Croydon A 10 p.e.	...	190 200	...
278,400	—	,,	12	12%	Croydon B and C 7 p.e.	...	150—160	...
492,370	Stk.	—	6	4½%	Derby Con. Stk.	123—125	...	...
55,000	,,	—	4	4%	Do. Deb. Stk.	102—104	...	...
1,002,180	10	Jan. 26	10	5/0	European, Ltd.	17½—18	8½—8⅝	8½—8⅝
6,398,975	Stk.	Aug. 11	1/17/4	46/8	Gas Light and Coke: 4 p.e. Ord.	94—102	7—77	73½ 76
2,600,000	,,	,,	3½	35/-	Gas Light and Coke: 5½ p.e. max.	76—79	53—56	54—55½
4,062,935	,,	,,	4	4%	Gas Light and Coke: 4 p.e. Con. Pref	96—99	69—72	69½—72
4,674,850	,,	Dec. 15	5	5%	Gas Light and Coke: 5 p.e. Con. Deb	72½—74½	53—55	54
150,000	,,	Dec. 11	10	10%	Gas Light and Coke: 10 p.e. Bonds.	...	...	...
82,500	,,	Sept. 14	5	5%	Hastings & St. L. 5 p.e.	...	...	...
258,740	,,	,,	3½	2½%	Do. 3½ p.e	87—89	45—55	...
70,000	10	May 12	11	5%	Hongkong & China, Ltd.	16½—16¾	5⅛—6⅛	...
86,600	Stk.	Aug. 26	9	9%	Hornsey 7 p.e.	...	100—105	...
131,000	,,	July 28	7½	7½%	Ilford A and C	151—154	100—105	
65,780	,,	,,	6½	5½%	Do. B	115—118	85—90	87
65,500	,,	Dec. 30	4	4%	Do. 4 p.e. Deb.	92—94	60—65	
1,976,000	,,	Oct. 28	9	5%	Imperial Continental	130—160	133—138	133—137
1,255,000	,,	Feb. 9	3½	3½%	Do. 3½ p.e. Deb. Red.	84—86	63—68*	...
235,242	,,	Aug 26	6½	6½%	Isle Bridge Ord. 5 p.e.	119—121	73—75	...
2,498,903	,,	Feb. 26	10	57/0	Liverpool 5 p.e. Ord. A	211—215	...	...
					Liverpool 5 p.e. Ord. B	146—148	...	...
306,083	,,	June 26	4	4%	Do. 4 p.e. Pr. Deb. Stk	...	...	...
165,736	,,	Aug. 11	7/3/0	6%	Maidstone 5 p.e.	...	54—56	...
63,480	,,	Dec. 30	—	3%	Do. 3 p.c. Deb.	...	43— 46	...
75,000	5	June 11	6	5%	Malta & Mediterranean	4½—4⅝	2—2½	...
250,000	100	Oct. 3	4½	4½%	Met. of Melbourne 4½ p.e. Deb.	99—101	93—100	...
541,920	Stk.	Nov. 30	4	4%	Monte Video, Ltd.	11½—12	53—58	54—55⅛
1,675,892	,,	July 28	4½	3½%	Newcastle & Gatsh'dCon.	98½—99½	67—69	...
589,705	,,	Dec. 30	5½	5½%	Do. 5½ p.e. Deb.	82—85	50—52	...
15,000	10	Aug. 26	—	7/6	North Middlesex 10 p.e.	...	12½—13	...
55,940	10	,,	7/14/0	5/3	,, 7 p.e.	14—15	7⅜—8⅛	...
300,000	Stk.	Dec. 15	8	8%	Oriental, Ltd.	117—122	84—87	
60,000	5	—	10	—	Ottoman, Ltd.	7½—7⅞	2—3	...
188,120	Stk.	Dec. 30	—	6%	Plym'th & Stonch'se 5 p.c.	...	69—72	
60,000	50	Aug. 26	15	60/-	Portsea Island, B	128—131	74—77	...
100,000	50	,,	12	55/-	Do. C	118—121	51—54	
249,980	5	—	8	—	Primitiva Ord.	5½—6	⅛—⅜	14/—14/3
499,960	5	—	5	—	Do. 5 p.e. Pref.	4⅛—5	1½—2½	40/3—41/3
521,800	100	Dec. 1	4	4%	Do. 4 p.e. Deb.	91—93	74—76	
600,000	Stk.	Jan. 26	4	4%	Do. ,, ,, 1911	...	50—55	54—54⅛
546,198	,,	Dec. 30	4	4%	River Plate 4 p.e. Deb.	84—87	50—55	...
150,000	10	Sept. 29	8	6/-	San Paulo 6 p.e. Pref.	10½—11	6—6½	...
125,000	50	Jan. 3	5	5%	San Paulo 5 p.e. Deb.	47—49	36—39	...
135,000	Stk.	Aug. 26	10	5%	Sheffield A	223—224	68—70	...
209,984	,,	,,	10	5%	Do. B	222—224	68—70	...
525,500	,,	,,	10	4½%	Do. C	220—222	68—70	...
135,201	Stk.	Sept. 14	4	4%	Shrewsbury 5 p.e.	...	...	...
90,000	10	Oct. 28	9	8%	South African	10½—11½	7—9	...
2,609,895	Stk.	Feb. 9	5/4/-	5%	South Met. Ord.	111—115	76—78*	76—77½
250,000	,,	Jan. 12	—	5%	Do. Red. Pref.	...	94—96	...
1,895,445	,,	,,	5	5%	Do. 3 p.e. Deb.	72½—74½	51—54	
224,820	,,	Dec. 15	8½	4½%	South Shields Con. Stk.	157—159	86—88	
1,087,795	,,	Aug. 11	6	5⅜%	S'th Suburb'n Ord. 5 p.e.	114—116	85—90	8⅛—89½
368,857	,,	Dec. 30	5	5%	Do. 5 p.e. Deb. Stk.	116—118	77—80	
647,740	,,	Nov. 16	7½	4%	Southampton Ord.	99—102	57—60	...
121,575	,,	Dec. 30	4	4%	Do. 4 p.e. Deb. Stk.	...	60—62	...
130,000	,,	Aug. 11	—	6%	Tottenham District: A 5 p.e.	135—138	89—94	...
782,275	,,	,,	6	4½%	Tottenham District: B 5½ p.e.	115—117	76—81	...
181,255	,,	Dec. 15	4	4%	Tottenham District: 4 p.e. Deb.	87—89	62—67	...
182,380	10	Dec. 30	5	—	Tuscan, Ltd.	3—6	1—2	...
149,900	10	July 1	5	5%	Do. 5 p.e. Deb. Red	93—95	45—50	
236,476	Stk.	Aug. 26	5	5½%	Tynemouth 5 p.e. max.	108½—109	67—69	...
					Wandsworth, Wimbledon, and Epsom—			
30,000	,,	Aug. 11	8½	66/3	Wandsworth A 5 p.e.	151—156	84—86	
255,636	,,	,,	6½	51/3	Do. B 5½ p.e	129—134	68—72	66—70
108,075	,,	,,	—	46/4½	Do. C	...	65—67	63—68
140,865	,,	,,	—	46/4½	New Ordinary	...	65—67	...
352,000	,,	,,	6½	45/-	Wimbledon 5 p.e.	117—122	65—67	65
98,000	,,	,,	6½	50/-	Epsom 5 p.e.	121—126	65—67	...
88,416	,,	Dec. 30	5	5%	5 p.e. Deb. Stk.	66—69	50—55	...

* Ex Div.

Drogheda and Prepayment Meter Users.—The Drogheda Corporation adopted a recommendation of the Gas Committee for reduction in the price of gas for ordinary meters from 8s. 4d. to 7s. 6d. per 1000 c.ft., to date from the 1st of January last. The new price for slot-meter users was fixed at 8s. 4d. per 1000 c.ft. The Mayor (Alderman Monahan) said they found that while users of the ordinary meter in 1919 20 paid 6s. 8d. per 1000 c.ft., they only got 6s. 1d. from prepayment meters, and in 1920-21 the ordinary meters paid 9s. 2d. and the slot meters only 8s. 9d. Hence the necessity for the new charges. They had reports from other undertakings, and found that the general procedure was to charge more on prepayment than on ordinary meter. Prepayment users paid no rent for meter or stove, and there was expense in fitting-up.

Sale and the Stretford Gas Proposal.—The Sale Urban District Council held a special meeting last Wednesday, in reference to the deputation of ratepayers who had interviewed the Council on the result of the poll taken in the district concerning the Stretford and District Gas Board Bill. It was decided that, as the Council as the result of the poll were precluded from further expenditure in connection with the promotion of the Bill, they should now notify the remaining promoting authorities that they had ceased to be associated with the promotion. The resolution expressed the opinion that for the Council it would be a not only most unusual, but unnecessary, procedure and expense. It was reported that the deputation from the Council who interviewed the Council's Parliamentary Agent in London had been informed that, if the Council passed a resolution asking Stretford and Ashton-on-Mersey to retain them in the Bill, and if the Parliamentary Committee agreed, this might be done, providing no expense was incurred by Sale. The expense should be borne by the Joint Board. If this was not done, Sale might still come in at a later stage by a Provisional Order at very little expense.

Scarborough Gas Company.—The report adopted at the annual meeting of the Company stated that, after providing for interest charges and the dividends on the Preference Stock, the Directors recommended the payment of the usual dividends on the ordinary stocks for the year ended Dec. 31, at the rate of 5 p.ct. per annum. There was 2½ p.ct. for the half year ended June 30 paid as an interim dividend; and the remaining 2½ p.ct. is now payable. An amount of £9637 is taken from the reserve account to make up the sum required for dividends. This withdrawal is almost wholly due to the great expense of maintaining the gas supply towards the end of the coal strike. The purchase of imported coal, and furnace coke, together with the larger quantity of oil used during that period, involved the Company in an increased expenditure of at least £8000. Owing to these heavy expenses, it was decided to suspend the depreciation on cookers, &c., as during part of the war period. The sale of gas to private consumers for the year showed an increase of 28 million c.ft.; but the consumption for public lighting decreased by nearly 5 millions, thus making a net increase of 23 million c.ft. (5 p.ct.) over the previous twelve months. Mr. A. Philip Allan (the Manager and Secretary) said that the proportion of water gas, 84 p.ct., during the coal strike was exceptional. In the ordinary course, 50 p.ct. was considered a fairly heavy proportion. As far back as 1901 they were sending out over 50 p.ct. on some days. So that whatever danger there was from carbon monoxide had been going on for twenty years; and there had only been one accidental death.

Gas Fatality at Chorlton-on-Medlock.—The Coroner returned a verdict of "Accidental death" at an inquest on a groom named Frith, who lodged in a house in Shakespeare Street, Chorlton-on-Medlock, Manchester. Frith was found dead in bed, with the room full of gas. Mrs. Lilian Matthews said he had lodged with her for about a month, and had complained of pains in his head. She found him lying in bed dead. The gas-tap was turned on. The gas was supplied through a penny-in-the-slot meter. She thought the deceased had left the gas alight when he went to sleep, instead of turning it out, as she had warned him to do. Next morning she put 2d. in the meter. This might have caused gas to escape from the bracket, which Frith had neglected to turn off. The Coroner said this was a thing about which people who used prepayment meters should be warned.

Fatal Escape from a Broken Main.—At an inquest at Cottingham, concerning the death of Mr. and Mrs. Allison, a market gardener and his wife, who were found dead in bed with the house full of gas, it was stated that they had not been seen for two days, and their bodies were found by their daughter, who had been spending the week-end at Hull. The evidence showed that none of the taps in the house had been turned on; but there was a broken gas-main outside the house, from which the gas escaped through the soil, and found an outlet into the house, filling all the rooms. Mr. J. R. Warren, District Manager of the British Gas Light Company, stated that the gas-main immediately outside Mr. Allison's house was broken clean in two; but the thickness of the pipe was above the present-day standard. He agreed that the British Gas Light Company took over the mains from the old Cottingham Gas Company twenty years ago; but it must not be inferred from this that the pipes had deteriorated. He could produce a gas-pipe in Hull eighty years old, which was superior in quality to a present-day pipe.

Uttoxeter and the Gas Supply.—There was a considerable amount of discussion at a meeting of the Uttoxeter Urban Council, relating to the action of the Gas Company in applying for powers for the sale of gas on the therm basis. The present price is 4s. 10d. per 1000 c.ft.; and the new powers, if obtained, would enable them to charge an amount equal to 6s. 3d. It was reported that the Chairman (Mr. J. T. Dainton) and Mr. C. A. Davies, with the Clerk to the Council, had attended a meeting of Directors of the Company, who during the war were understood to have had an unprofitable time, owing to the scarcity and heavy price of coal, and had been unable to pay the usual 10 p.ct. on the ordinary shares. Mr. Davies said he did not object to the Company's making a charge which would enable them to pay a fair dividend; but he did not approve of the proposed change. Mr. Orme said that during the war the Company had done very fairly by the public; and he did not advise opposition to the application. Mr. Dainton said they would not have taken the matter up but for the numerous complaints regarding the poor quality of gas supplied. It was decided to write to the Board of Trade for more information.

Rock Safety Geysers has been registered, with a capital of £300, to manufacture tanks, geysers, and similar appliances.

Messrs. Clayton, Son, & Co., Ltd., of Leeds, have recently been successful in obtaining orders for welded steel mains from the Birmingham Corporation Water-Works Department, and also from the Metropolitan Water Board.

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